PROCEEDINGS

OF THE

Hawaiian Entomological Society

VOL. VII, No. 3 FOR THE YEARS 1929-1930 APRIL, 1931

JANUARY 3, 1929

The 276th regular meeting of the Hawaiian Entomological Society was held at the Experiment Station, H. S. P. A., at 2:35 p.m. President O. H. Swezey in the chair. Other members present were: Messrs. Bryan, Chock, Ehrhorn, Fullaway, Illingworth, Mason, Rosa, Swezey, Van Zwaluwenburg and Williams.

In the absence of the Secretary-Treasurer, Dr. Williams was appointed by the president to fill the vacancy pro tem.

The minutes of the 275th meeting were read, minor corrections were made thereto, and approved.

The report of the officers of the Executive Committee, having met just prior to the present meeting, showed the reappointment of Mr. F. C. Hadden as librarian, of Mr. O. H. Swezey as editor and of Dr. F. X. Williams as custodian of collections.

Mr. Fullaway reported having audited the report of the treasurer for 1928 and found the accounts correct.

Mr. M. H. Cassidy was elected to active membership.

NOTES AND EXHIBITIONS

Dermestes cadaverinus Fab.—Mr. Ehrhorn reported finding, Jan. 3, 1929, the larvae of *D. cadaverinus* in holes which they had bored into the soft part of northwest pine in the hide room of the Hawaii Meat Company. The beetles have been noticed in great numbers at times among the hides, horns and hoofs in the warehouse.

This note brought forth a discussion by Messrs. Illingworth, Chock, Swezey and Fullaway on insects that bore wood, chiefly

for purposes of pupation, *Catorama* and the codling moth being mentioned.

Collecting trip to West Maui.—Mr. Bryan spoke of the trip to the West Maui mountains taken in December, 1928, by Messrs. Swezey, Ewart, Monroe and himself and Walker, for part of the time. Headquarters were established at the mountain house, "Haeleau," of Baldwin Packers, Ltd., at 3,000 ft. elevation. The ascent of Puu Kukui and its botanical characteristics were briefly described.

Copris incertus var. *prociduus* (Say).—Mr. Swezey reported the finding of this dung beetle at two new localities on Maui, December 23, 1928. One was up Kanaha Valley back of Lahainaluna School, about three miles from Lahaina, and above 1,000 feet elevation. The other was in a pasture at Honolua, where the land was being cleared for the planting of pineapples, at an elevation of about 1,200 feet. These records following Dr. Williams' recovery of the beetle at Wailuku in February, 1928, and in Kauaula Gulch back of Lahaina on August 30, 1928, indicate that it is pretty well spread on Maui, as these localities are a considerable distance from where it was first liberated in 1923 near Olinda.

New Insect Records on Maui.—Mr. Swezey reported collecting the following immigrant and introduced insects on Maui, apparently the first record of their occurrence there:

Coccotrypes dactyliperda (Fab.)—Lahaina, in seeds of edible date, Dec. 17, 1928.

Atractomorpha ambigua Bol.—One large nymph swept from grass by roadside at Honokowai Camp, four miles north of Lahaina, Dec. 23, 1928.

Lysiphlebus testaceipes Cress.—Quite a good many parasitized aphids on Hibiscus at Pioneer Hotel, Dec. 17, 1928. *Pachyneuron siphonophorae* issued from some brought in.

Uscana semifumipennis Gir.—Reared from bruchid eggs on kiawe pods at Lahaina, Dec. 17, 1928.

Plutella capparidis Sw.—Larvae quite numerous on *Capparis sandwichiana* on rocky cliff in Kanaha Valley back of Lahainaluna School, Dec. 23, 1928.

Trypoxylon philippinensis Ashm.—Cocoons and larvae found in old nest of Sceliphron at Lahaina, Dec. 17, 1928. One adult issued Dec. 26, 1928.

Insects at light on Molokai.—Mr. Swezey presented the following list of insects taken at light at Kaunakakai, Molokai, September 6, 1928, by Mr. Kutsunai. Those marked by an asterisk were not previously recorded from Molokai:

Coleoptera—

1 *Schistoceros cornutus* Pall.
1 *Epitragus diremptus* Karsch.
1* *Bruchus sallaei* Sharp.
3 *Aphodius lividus* Oliv.
1* *Lyctus brunneus* (Steph.)

Diptera—

2 *Sciara molokaiensis* Grims.
1 *Idiophlebia pallida* Grün.
1 *Trimicra pilipes* (Fab.)
1 *Musca vicina* Macq.
3 *Psychoda* sp.

Lepidoptera—

1 *Phthorimaea lycopersicella* Busck.

Hymenoptera—

4 *Camponotus maculatus mitis hawaiiensis* Forel.

Hemiptera—

1 *Zelus reynardii* Kol.
1 *Arctocorixa blackburni* (White)

Neuroptera—

1* *Chrysopa lanata* Banks.

Isoptera—

5 *Kalotermes immigrans* Snyder.

New Insect Records for Molokai.—Mr. Swezey reported collecting the following beetles and scale on Molokai, November 2, 1928, which apparently have not been previously recorded from that Island:

Azya luteipes Muls. Swept from pigeon peas at Kawela.
Caryoborus gonagra (Fab.) On kiawe at Kaunakakai.

Bruchus amicus Horn. Swept from pigeon peas at Kawela.

Xylopsocus castanoptera (Fairm.) Boring in stems of pigeon peas at Kawela.

Colobicus parilis Pascoe. Stuck in paint on building at Kanoa.

Lyctoxylon japonum Reitter. In dead kiawe at Kanoa.

Asterolecanium pustulans (Ckl.) This scale insect was also found on kiawe at Kaunakakai. Not previously recorded from Molokai.

Cyrtorhinus mundulus (Bredd.)—Dr. Williams mentioned finding this leafhopper egg-sucking bug on a small patch of Lahaina cane near Kaunakakai, Molokai, December 14, 1928. This insect migrated there of itself. He also spoke of *Scaevola chamissoniana* plants seemingly killed and injured by a diaspine scale, on a hillock at the head of Manoa Valley, the resulting honey dew attracting many male mole-cricket wasps (*Larra luzonensis* Rohwer), some *Xenocrabro distinctus* (Sm.), a few *Trypoxylon,* and, perhaps more than any other insect, *Evania* sp. that destroys the egg cases of roaches. *Atractomorpha ambigua* Bol. grasshoppers are very fond of this *Scaevola* and disfigure its leaves.

FEBRUARY 7, 1929

The 277th meeting of the Hawaiian Entomological Society, was held at the Experiment Station, H. S. P. A., at 2:30 p. m., President Swezey presiding. Other members present were: Messrs. Bryan, Cassidy, Ehrhorn, Fullaway, Hadden, Illingworth, Mason, Rosa, Willard and Williams. Mr. W. H. Thorpe, an entomologist from England, and Mr. L. R. Alderman, who is interested in commercial insect control in California, were visitors. The minutes of the previous meeting were read and approved.

The secretary reported that the supply of copies of the Proceedings of the Hawaiian Entomological Society had been removed to the Bishop Museum for storage.

Mr. Thorpe spoke briefly of observations he had made on a Dipteron, *Chryptochaetum iceryae,* a fly parasitic on the cottony cushion scale *Icerya purchasi* Mask. He also exhibited some very

interesting photographs showing the peculiar form in the different larval stages of this parasite.

Mr. Alderman talked on his work on the control of insect pests in California, particularly emphasizing his success in controlling the Argentine ant, *Iridomyrmex humilis* (Mayr). There followed a discussion of ant control in general.

PAPERS

Mr. E. H. Bryan presented the following paper:

"New Acalyptrate Diptera from Pacific and Oriental Regions."

BY J. M. ALDRICH, U. S. NATIONAL MUSEUM.

"Long-horned Grasshopper, *Conocephalus saltator* (Saussure) as a Pest of Pineapples in Hawaii."

BY J. F. ILLINGWORTH.

"*Tarsonemus ananas* Tryon, a Mite that is becoming a serious pest of Pineapples in Hawaii."

BY J. F. ILLINGWORTH.

NOTES AND EXHIBITIONS

New Records of Hawaiian Diptera.—Mr. Bryan exhibited specimens of the following Diptera from the Hawaiian group, which had been recently determined by Dr. J. M. Aldrich, U. S. National Museum.

Scenopinidae—

Scenopinus lucidus Becker, Ewa Coral Plain, Diamond Head, Koko Head and Mokapu Peninsula, Oahu.

Chloropidae —

Siphunculina signata Woll., Honolulu, Oahu; Nihoa I., and French Frigate Shoals, 1923.

Milichiidae—

Milichiella circularis Aldrich (described in these Proceedings, p. 397). Hovering near compost heap, H. S. P. A. Experiment Station, Honolulu, and pineapple fields on Oahu. (Paratypes.)

Milichia orientalis Malloch., Oahu, ex barley seed (Illingworth No. 5); Nihoa I., Necker I., and Gardner I., 1923.

Ephydridae—

Canace nudata Cresson, Nihoa I., 1923.

Atissa antennalis Aldrich (described in these Proceedings, p. 395). Necker I., 1923. (Type.)

Geomyzidae—

Tethina insularis Aldrich (described in these Proceedings, p. 395). Wake I., and Pearl and Hermes Reef, 1923.

Bryania bipunctata Aldrich (described in these Proceedings, p. 397). Nihoa I., 1923.

Sciomyzidae—

Sciomyza hawaiiensis Grimshaw, Oahu, and Puna, Hawaii.

Anthomyiidae—

Hylemyia cilicrura Rondani, Oahu.

"Black witch" on Hawaii.—Mr. Bryan exhibited a specimen of *Erebus odora* (Linn.) which was collected at Kealakekua, Hawaii, inside a house at night, and sent to the University of Hawaii for identification by G. R. Greenwood.

Erebus odora (Linn.)—Dr. Williams reported the capture, by Mr. Swezey and himself at the old Macdonald Hotel, on Punahou St., of the fifth specimen of the "Black Witch" *Erebus odora,* on January 24, 1929.

Araneus nauticus L. Koch.—Mr. Ehrhorn exhibited a spider *Araneus nauticus* L. Koch, determined by F. X. Williams. He stated that this spider is not very common and makes quite a large web with strong threads.

Wood Preservative.—Mr. Ehrhorn called attention also to a new preservative, Zinc Meta-arsenite which does not reduce the strength of wood and does not increase its electrical conductivity.

Milichiella circularis Aldrich.—Dr. Illingworth stated that this fly was first reported in Honolulu (Proc. Haw. Ent. Soc. Vol. VI, 378, 1926) by Swezey, is spreading on Oahu. More recently Illingworth has reported this fly abundant near a compost heap at the University of Hawaii. Specimens he collected were described by Dr. J. M. Aldrich, as above. During January, 1929, Illingworth found swarms of these flies hovering high up about a

telephone pole in a pineapple field at Waipio, about 20 miles west of Honolulu. In this instance, there was no compost heap in the vicinity. Possibly the flies were breeding in refuse from the pineapple tops and some souring fruit, at the end of the rows. In a discussion that followed, doubts were expressed as to just where this fly breeds, no one having observed it actually breeding in compost.

Metromenus fraternus (Blkb.) as a host for *Laboulbenia.*—Mr. Swezey reported that he had come across a specimen of this carabid beetle in the Bishop Museum collection, collected by Perkins at 2000 ft. near Honolulu in 1892, which had about two dozen specimens of *Laboulbenia* on the left antenna, and a cluster of about a dozen on the left eye, and a few scattered ones besides. This carabid is not included among those previously listed as hosts for *Laboulbenia.* See Proc. Haw. Ent. Soc., III, p. 110, 1915.

Gryllotalpa africana (Beauv.)—Mr. Swezey reported that Sa Ning of the Agricultural Department of the Experiment Station, H. S. P. A., told him of the occurrence of the mole cricket in rice fields at Keanae, Maui, when he lived there as a boy. He had recently become familiar with the mole cricket in the cane fields at Kailua, Oahu, and recognizes it as the same that he used to know on Maui. The entomologists had not previously known of the mole cricket on Maui. None of them have ever visited the rice fields at the place mentioned.

Chilo simplex (Butl.)—Mr. Swezey reported that Mr. Van Zwaluwenburg had written from Kauai of finding larvae of *Chilo simplex* in rice stubble at Waimea. This shows that the pest is now thoroughly distributed on Kauai, for it has been previously found at Hanalei, Kapaa, Wailua, Kapaia, Nawiliwili, Huleia and Hanapepe. The only important rice area in which Chilo has not yet been found is Anahola. As this is intermediate to several other regions, it probably is there already, or will be found soon.

American Foul Brood.—Mr. Fullaway reported that an Apiculturist in the U. S. Department of Agriculture had determined samples of diseased brood sent to him from St. Louis College and the Catholic Convent in Kaimuki to show unmistakable evidence of American foul brood. Brother James Ritter, who sent the

specimens, declares that all the diseased hives have been destroyed by fire, but it is not certain that the apiaries in the vicinity are unaffected, as no examination has been made recently.

New Records of Insects on Molokai.—Mr. Swezey reported having collected on Molokai January 25th, the following insects which apparently had not been previously recorded from that island:

Draeculacephala mollipes (Say).—A few specimens on sugar cane at Kawela.

Pseudogonatopus hospes Perkins.—An adult sugar cane leafhopper parasitized by this dryinid, on cane at Kawela.

Bruchus limbatus (Horn).—A few of this monkeypod bruchid collected at Kawela.

Urosigalphus bruchi Crawford.—One specimen collected at Kanoa. Bruchid parasite.

Glyptocolastes bruchivorus Crawford.—One specimen collected at Kanoa. Bruchid parasite.

Xenos auriferi Pierce.—Two *Polistes aurifer* Sauss. collected at Kanoa, both parasitized by *X. auriferi.* One of them had empty puparium of the male; the other contained a female from which the young were issuing and crawling about on the abdomen of the wasp.

Haplothrips usitatus (Bagn.)—This black thrips was found on several kinds of grass, and other plants: *Chaetochloa verticillata, Chloris paraguayensis, Chloris radiata, Eragrostis cilianensis, Cenchrus echinatus, Prosopis juliflora, Acacia farnesiana, Cassia occidentalis,* sugar cane (one specimen).

MARCH 7, 1929

The 278th regular meeting of the Hawaiian Entomological Society was called to order at 2:30 p.m. by President O. H. Swezey, at the Experiment Station, H. S. P. A. Other members present were: Messrs. Bryan, Ehrhorn, Fullaway, Illingworth, Mason, Van Zwaluwenburg, Willard and Williams. Mr. Julian P. Scott, representing Science Service, Inc., Washington, D. C., and known as the "Kodaker of science," was a visitor.

The minutes of the 277th meeting were read and approved.

NOTES AND EXHIBITIONS

Erebus odora (L.)—Mr. Van Zwaluwenburg reported the capture of two specimens of this noctuid at Lihue, Kauai, by Mr. Albert Duvel, one on January 27, the other February 1, 1929.

Both were taken during daylight hours in a room having an open window.

Copidosoma truncatellum Dalm.—Mr. Swezey exhibited a large number of what seemed to be this parasite that had issued from a single caterpillar of *Plusia chalcites*. He had first found a parasitized Plusia caterpillar on February 27, among a batch of caterpillars collected from weeds by the roadside on McCully St. He also found parasitized caterpillars on geranium plants at his place in Manoa, February 28, and several of them on Datura in the Experiment Station, H. S. P. A. grounds, March 1.

Euscelis stactogalus Am.—Mr. Swezey reported having found this cicadellid abundant on Tamarix trees at Waianae, March 3, 1929.

Nonachrostichus citricola.—Mr. Fullaway exhibited the larvae and adult of *Nonachrostichus citricola* (Trypetidae or fruit flies) which according to Baker infests wild oranges in the Philippine Islands. The worms were found in limes taken in the inspection of baggage of four steerage passengers coming from the Philippines.

APRIL 4, 1929

The 279th regular meeting of the Hawaiian Entomological Society was called to order by President O. H. Swezey, at 2:30 p.m., at the Experiment Station, H. S. P. A. Other members present were: Messrs. Bryan, Cassidy, Fullaway, Hadden, Illingworth, Mason, Rosa, Willard and Williams.

Minutes of the 278th meeting were read and approved.

The president called attention to the extended illness of Mr. W. M. Giffard, an initial member of this Society, and suggested that the secretary send to him, on behalf of the Society, some flowers and a note expressing regrets because of his illness and conveying to him the esteem in which he is held by our members. Upon motion by Mr. Bryan, it was so voted.

Mr. Swezey called the attention of those present to a notice in the Journal of Economic Entomology announcing the death of J. Kotinsky, sometime during the winter of 1927-28. Mr. Kotinsky was an initial member of the Hawaiian Entomological Society, resigning in 1910.

PAPERS

"Haleauau Valley, the locality where the Rev. Blackburn collected in the Waianae Mountains."

BY O. H. SWEZEY.

NOTES AND EXHIBITIONS

Lepidosaphes uniloba (Kuwana).—Mr. Fullaway exhibited specimens of this diaspine scale insect which, while known here for some years, has not previously been recorded, as far as he knows. It was found on maile (*Alyxia olivaeformis*).

Archytas cirphis Curran.—Mr. Swezey reported observing 17 of this large introduced Mexican tachinid at one time feeding on the flowers of *Nothopanax cochleatum* at the Exp. Station, H. S. P. A., March 20, 1929. Following this note, a general discussion brought out the fact that this parasite had been observed on all parts of Oahu, and in large numbers between Hilo and Pepeekeo, on the Island of Hawaii.

Erebus odora (L.)—Mr. Cassidy reported this moth as being numerous about Kamehameha Schools in Kalihi. Since this moth was discovered in the Hawaiian Islands, no one, as far as is known, has observed the caterpillar.

Thrips panicus Moulton.—Mr. Swezey reported having just received from Mr. Moulton this as the name of the thrips, previously reported as occurring on canes in quarantine house on Molokai. It is a new species which Moulton had already had from *Panicum maximum* from Baragua, Cuba. Mr. Swezey had recently, March 26, found it on *Echinochloa crusgalli crus-pavonis*, a grass at the Kailua substation, and Dr. Williams had found a specimen on cane there. On Molokai, after considerable search, it has not yet been collected in the open.

Polynema saga (Gir.)—Mr. Swezey called to attention that in the March, 1929, issue of Annals of the Entomological Society of America, page 130, this mymarid is mentioned as an egg-parasite of *Euscelis stactogalus* in Kansas. Comparing specimens bred from the same host eggs in Honolulu in 1928, with Girault's description

(Tr. Am. Ent. Soc., 37, p. 296, 1911), Mr. Swezey is of the opinion that it is the same species. Specimens were sent to Mr. Timberlake for determination.*

Some additional new records for Molokai.—Mr. Swezey reported having collected the following on Molokai, and were apparently new records for the species on that island:

Trichogramma minutum Riley.—Reared from egg of *S. exigua,* Kanoa, March 22.

Eucnocerus anthrenoides Sharp. Kaunakakai, March 22.

Encyrtus infelix (Embleton).—Kaunakakai, March 23.

Copris incertus var. *prociduus* (Say).—At Mapulehu dairy, March 22.

Dryophthorus homoeorhynchus Perkins.—In dead *Dracaena aurea,* Puu Kolekole, March 23.

Aloha myoporicola Kirk.—On *Myoporum sandwicense,* Kawela, 1500 ft., March 23.

Ilburnia leahi (Kirk.)—On *Lipochaeta lobata,* Kawela, 1000 ft., March 23.

Mr. Bryan read a letter from A. H. Adamson who is collecting insects with E. P. Mumford in the Marquesas Islands. Mr. Adamson reported many interesting experiences, together with profitable insect collecting.

MAY 2, 1929

The 280th regular meeting of the Hawaiian Entomological Society was held at the Experiment Station, H. S. P. A., at 2:30 p.m., President Swezey in the chair. Other members present were: Messrs. Bryan, Fullaway, Hadden, Illingworth, Mason, Rosa, Whitney and Willard.

The minutes of the 279th meeting were read and approved.

* Mr. Timberlake's determination is recorded in Proc. Haw. Ent. Soc., VII., p. 224, 1929.

PAPERS

"Insects of the Waiahole Ditch."

BY J. F. ILLINGWORTH.

***"Litomastix floridana* (Ashm.), A Recent Immigrant in Hawaii."**

BY O. H. SWEZEY.

NOTES AND EXHIBITIONS

Cyrtorhinus mundulus (Bred.)—Dr. Illingworth recently exposed sheets of Tanglefoot fly-paper, tacked on boards, in pineapple fields, to determine what insects visit them. He was surprised to find a considerable number of this valuable capsid bug among the insects captured. The species is evidently not confined to sugar-growing areas. He also took this bug in the greenhouses at the University of Hawaii, April 20, 1929.

Rare beetles.—Mr. Bryan exhibited a number of interesting specimens of rare beetles that have been collected by his students at the University of Hawaii.

Erebus odora (L.)—Mr. Mason reported having seen a specimen of this large moth come to light at his residence in Manoa Valley.

Immigrant Beetles in Quarantine.—Mr. Whitney exhibited adults and immature stages of two species of beetles removed in quarantine at Honolulu, from a shipment of telephone poles from Newcastle. The shipment consisted of poles from ten or a dozen different species of trees and some of them were quite heavily attacked by borers. Several members expressed the opinion that these poles should be given a thorough heat treatment before being allowed entry into Hawaii.

Thecla echion (Linn.)—Mr. Swezey reported having reared this butterfly from a larva found on *Datura arborea,* April 12, 1929, at the experiment station grounds. This is a new record of host plant for this butterfly in Hawaii. It was introduced from Mexico in 1902 on account of its larvae feeding on lantana flowers. It has occasionally been reared from eggplant, *Cordia sebestena,* and once from *Solanum nodiflorum.*

Agromyza sp.—Mr. Swezey exhibited a black agromyzid bred from a Zinnia stem in his garden at 2048 Lanihuli Drive, Manoa, April 12, 1929. Several small plants had wilted. Maggots were found in them. This one that has matured resembles *Agromyza lantanae* Froggatt, but has structural differences. It is distinctly different from *Agromyza pusilla* Meig. the leaf-miner in so many plants. Apparently a new immigrant in Honolulu.

Euscepes batatae (Waterh.)—Mr. Swezey exhibited a specimen bred from a larva found in an ornamental plant at Mr. John Hind's, Upper Manoa Road, April 13, 1929. Several plants had larvae in the stems. The plants had no blossoms and it was not known what they were.

New Records for Molokai.—Mr. Swezey mentioned the following:

Entedonine sp.—No. 104 in Timberlake's list, Proc. Haw. Ent. Soc. V, p. 441, 1924. Reared from a cocoon of *Arachnoleter swezeyi* Cush., a parasite of spider eggs, collected at Kawela, April 26.

Thysanus dactylopii (Ashm.)—Hyperparasite on mealybugs, swept from Bermuda grass, Kawela, April 26.

Erebus odora (L.)—Reported by Mrs. Wight at Kaunakakai.

JUNE 6, 1929

The 281st regular meeting of the Hawaiian Entomological Society was held at the Experiment Station, H. S. P. A., at 2:30 p.m., Vice-President Whitney in the chair. Other members present were: Messrs. Bryan, Cassidy, Fullaway, Hadden, Mason, Rosa and Williams. Mr. A. W. Lopez was a visitor. Mr. Bryan was asked to serve as acting secretary.

The minutes of the 280th meeting were read and approved.

NOTES AND EXHIBITIONS

Mr. Whitney stated that the shipment of poles, reported at the last meeting as being infested with beetles, had been heat-

treated in the yard of the Oahu Railway and Land Company. The treatment had lasted six hours at a temperature of 160 to 178 degrees F.

Erebus odora (L.)—Mr. Mason reported having seen several more specimens of this large "black witch" moth, which now seems to be quite abundant in Honolulu.

Notes on insects on Molokai.—Dr. Williams reported the following observations made on insects at Kanoa, Molokai, May 31 to June 1, 1929:

> The little wasp, *Silaon rohweri* Bridwell (Larridae) was observed in the kiawe woods. The first record for that island.
>
> The area about the quarantine houses is somewhat of a Mecca for certain Hymenoptera. *Apis mellifera*, the honey bee, is nesting between the soil and the boarding in the well that is being used, and numbers may be seen drinking at basins surrounding the pillars of the quarantine house and about leaking faucets and the resulting puddles. One or more species of Megachile occur, and the leaves of such plants as the tender Solanaceae, a Cucurbitaceae and Stachytarpheta show where discs for nest building have been cut out. The immigrant *Pachodynerus nasidens* (Latr.) is common, and of the Polistes, *P. fuscatus* var. *aurifer* Sauss. was the most frequently seen.
>
> The Philippine cricket wasp, *Notogonidea subtessellata* (Sm.) was not uncommon, while the mud-dauber, *Sceliphron caementarium* (Drury) was very abundant at water from a leaking faucet.
>
> The common and actively flying tenebrionid beetle, *Epitragus diremptus* Karsch, was abundant also in the larval stage. The larvae were found in the fine, light, silt-like soil alongside the road. They made some very superficial burrows that cracked the surface as do those of mole-crickets, for which I first mistook them. The larvae are pallid and fidgetly active.
>
> The large carpenter ant, *Camponotus maculatus* var., is nocturnal, and may be seen racing about at night This insect

and many others fall a victim to the hour-glass spider, *Latrodectes mactans,* whose irregular, more or less horizontal webs, stretched between rocks in the storm-water channels, were common.

About the sugar cane in the plot at Kawela the males of *Scolia manilae* Ashm. flew in swarms.

In shaded portions of a field at Cooke's Dairy *Copris incertus* var. *prociduus* (Say) was exceedingly abundant, and over 1000 specimens were collected in cattle manure there by two of us in two hours and a half.

Mr. A. W. Lopez, a graduate of the University of California, on his way to the Philippine Islands to become entomologist for the Philippine Sugar Association, spoke concerning some of his researches at the University of California, where he worked with Professor W. B. Herms, and the helpful coöperation he had everywhere received in his preparations for work on sugar cane pests in the Philippines. One piece of graduate research which he had done was a morphological study of the head and mouthparts of the mature codling-moth larva, *Carpocapsa pomonella* (Linn.). Copies of the published results of this work were distributed to the members present. Another experiment on which he had been engaged was a study of the reactions of insects to lights of different color and intensity. The experiment had been planned for codling moths, but they not being available, the coccinellid beetle, *Hippodamia convergens* Guerin, was used instead. Mr. Lopez had left before the experiment had been completed. As a background for work on the biological control of sugar cane pests in the Philippines, Mr. Lopez had visited the Citrus Experiment Station at Riverside, California, and was now spending two weeks in Honolulu. He stated that he had everywhere received generous help and coöperation. The experiment station of the Hawaiian Sugar Planters' Association was furnishing him with a collection of identified specimens of the more serious sugar cane pests of the Pacific region, to be used in identifying pests in the Philippines. Mr. Lopez is leaving Honolulu June 13.

Mr. Bryan reported that his attention had been called to a house and yard in Honolulu badly infested by fleas. Remedies

suggested by various members of the society included soaking the ground with water at frequent intervals, spraying with a dilute solution of creolin, or, where there was no danger of increased fire hazard, spraying with kerosene. The source of infestation had evidently been a pet dog.

Dr. Williams distributed to members of the society copies of a revised reprint from the Hawaiian Planters' Record (Vol. XXIX, No. 4, October, 1925) containing an essay by Perkins on the "Early work of Albert Koebele in Hawaii," a biographical sketch by Swezey of Koebele's work in Hawaii, and a list by Swezey of "Records of introduction of beneficial insects into the Hawaiian Islands."

JULY 11, 1929

The 282nd regular meeting of the Hawaiian Entomological Society was called at 2:30 p.m., at the Experiment Station, H. S. P. A., President Swezey presiding. Other members present were: Messrs. Bryan, Chock, Fullaway, Hadden, Illingworth, Mason, Weinrich, Willard and Williams.

The reading of the minutes of the 281st meeting was postponed until the next meeting.

Upon motion by Dr. Illingworth, Mr. William Weinrich, an old member of the Society who resigned in 1908, was reinstated as an active member.

Upon motion by Mr. Bryan, the following resolutions were unanimously adopted:

"WHEREAS, in the death of Mr. W. M. Giffard, June 30, 1929, the Hawaiian Entomological Society has lost one of its most devoted members, and

WHEREAS, Mr. Giffard was one of the charter members of the Society and has ever taken the deepest interest in the welfare of the Society, faithful in attendance at meetings, serving several times as President, always ready to participate in discussions, and contributing valuable papers for printing in the Proceedings, and

WHEREAS, he has always had the keenest interest in the furthering of knowledge of the Hawaiian insect fauna, and in official capacity has been prominent in formulating plans and projects of economic entomology in Hawaii thus worthy of credit for much of the success which has followed efforts at biological control of insect pests in Hawaii, therefore

BE IT RESOLVED, that the Hawaiian Entomological Society hereby expresses its appreciation of his interest and participation in its affairs, and records the grievous loss it has suffered in the passing of Mr. Giffard, and

BE IT FURTHER RESOLVED, that a sketch of Mr. Giffard's participation in entomology in Hawaii be prepared for publication in the Proceedings of the Society, and that a copy of these resolutions be sent with an expression of deep sympathy to the bereaved family."

The president, Mr. Swezey, and Mr. Fullaway, were asked to prepare for publication in the Proceedings, a sketch of Mr. Giffard's participation in entomology in Hawaii.

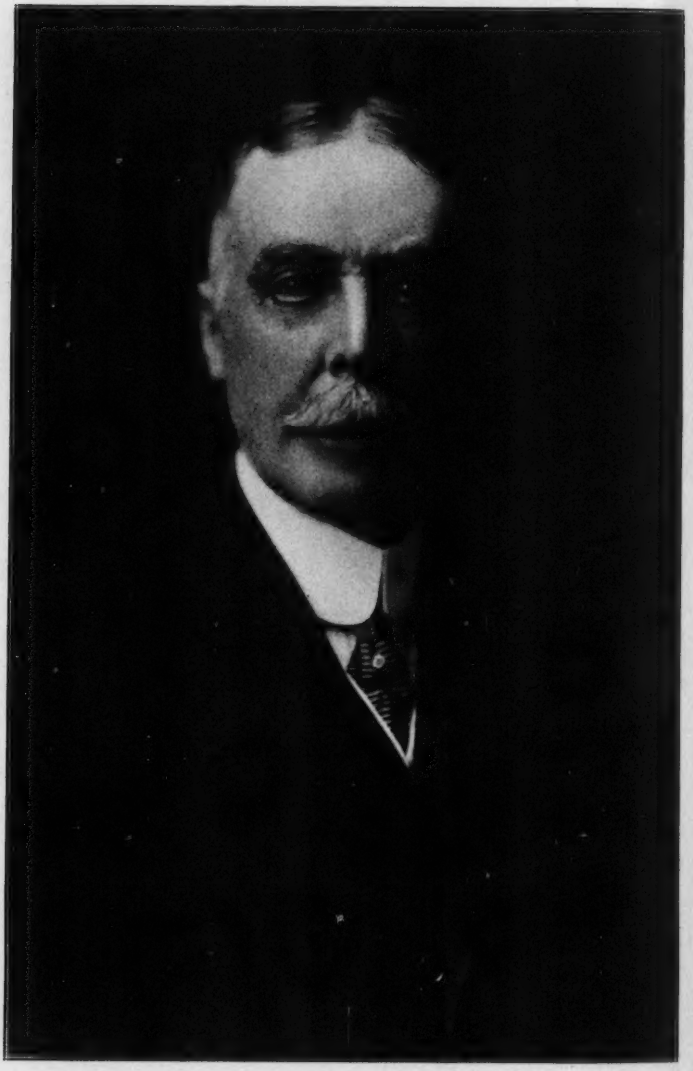
WALTER M. GIFFARD

A Biographical Sketch

BY O. H. SWEZEY AND D. T. FULLAWAY

In the death of Mr. Walter M. Giffard, June 30, 1929, a man prominent in the early organization of the Experiment Station, H. S. P. A., and an original member of the Hawaiian Entomological Society, and who has always had their interests at heart, passed to his reward.

Mr. Giffard was born in the Island of Jersey, whence he came to the Hawaiian Islands in 1875 at the age of 19. He soon (1877) joined the firm of W. G. Irwin and Company, Ltd., and thus became connected with the sugar industry at an early date and soon rose to prominence during the time that rapid development of this industry was taking place in Hawaii. From bookkeeper he was promoted in turn to treasurer, secretary and finally vice-



WALTER M. GIFFARD

president, which office he held at the time when W. G. Irwin and Company, Ltd., dissolved in 1909 and its interests were consolidated with C. Brewer & Company, Ltd. At that time Mr. Giffard retired from official business life, although he was still a director in several of the sugar plantation companies for whom the W. G. Irwin Company had been agents.

Mr. Giffard's special interest in the Experiment Station began in 1903, when as chairman of an organizing committee, he took the leading part in a reorganization of the Experiment Station during the course of which a Department of Entomology was created. This new department had become necessary on account of the devastation caused by the sugar cane leafhopper pest (*Perkinsiella saccharicida*), whose introduction from Australia had occurred a few years previously, and which had now become spread throughout the sugar plantations of the islands and was threatening to ruin the industry. Dr. R. C. L. Perkins was chosen to head this new Department of Entomology, with Messrs. G. W. Kirkaldy and F. W. Terry, who had been connected with the territorial plant quarantine inspection work, to assist him. In 1904 this entomological staff was increased by the addition of Mr. O. H. Swezey, and in 1905 Mr. F. Muir was added to the staff. The early work of the Department of Entomology involved the study of the leafhopper in Hawaiian cane fields, and the introduction of natural enemies of the leafhopper from other lands. Thus was Mr. Giffard instrumental in the application of this line of entomology to the sugar industry, following the valuable work of Mr. Albert Koebele who had for about 10 years been engaged in introducing ladybeetles and other natural enemies for the control of horticultural pests. A method of insect pest control that has continued in practise and has been eminently successful in Hawaii.

It was while Mr. Giffard was the chairman of the Experiment Committee that the Department of Pathology was originated in 1904 and Dr. N. A. Cobb obtained as its head.

Mr. Giffard also became interested in the attempt to produce cane seedlings and it was due to his urgent appeal that the propagation of seedlings was finally inaugurated in the season of 1904-5. The celebrated H 109 and several other varieties of notable value were derived from these early propagations.

For a long period of years (1903-1923) Mr. Giffard was a commissioner on the Board of Agriculture and Forestry of Hawaii, of which he was president for three terms. In connection with this he was much concerned with the horticultural interests of the Territory, and was largely responsible for the promulgation of plant quarantine regulations for the purpose of preventing the entry of additional insect pests to these islands. When the Mediterranean fruit fly made its appearance in 1910, it was Mr. Giffard who headed a cleanup campaign in the endeavor to control the pest and lessen the injury to fruit by its maggots. On the failure of this endeavor, Mr. Giffard planned the campaign for the search of parasites and their introduction, which resulted in the introduction of five species of parasites from Africa and Australia, and a subsequent reduction of fruitfly damage.

From Mr. Giffard's interest in the Department of Entomology during the time he was involved in its organization, and while chairman of the Experiment Station Committee (1903-1907), and his association with the entomologists, he became keenly interested in entomology and took up insect collecting as a recreation. After his retirement from active business he had much time for this, and built up large collections of the native Hawaiian insects, which in several groups, or important families were more complete than any other collections in Honolulu. On his death, these were willed to the Bishop Museum.

When the Hawaiian Entomological Society was founded in 1905, Mr. Giffard was one of the original members, and was always a staunch supporter of the Society. He was twice president, and contributed numerous papers resulting from his studies of the insects he had collected. Those of notable importance dealing with Hawaiian wasps and leafhoppers, his interest in the latter group having been aroused by reason of the fact that it was a leafhopper pest that had made the occasion for a Department of Entomology to be organized at the Experiment Station and the part that he had had in this. A closely related group, the Hawaiian Cixiidae, was carefully studied and a monographic revision of this family by him was published in the Proceedings of the Hawaiian Entomological Society and constituted his most important entomological paper. Many new species of insects were named for Mr. Giffard, a good proportion of them being species discovered

by him. Further plans for continuing his studies with Hawaiian insects were cut short by the prolonged illness from which he finally succumbed on June 30th at the age of 73 years.

Mr. Giffard was a 32nd degree Mason, Knight Templar and Shriner; honorary member of the Honolulu Chamber of Commerce and of the Hawaiian Sugar Planters' Association; fellow of the Entomological Society of London and of the American Association for the Advancement of Science; member of American Association of Economic Entomologists, Biological Society of Washington and Pacific Coast Entomological Society; charter and life member of the Entomological Society of America.

PAPERS

"New Diptera names in Hawaii."

BY E. H. BRYAN, JR.

"The Black Widow Spider"

BY J. F. ILLINGWORTH

NOTES AND EXHIBITIONS

Nesopimpla naranyae Ashm.—Mr. Fullaway exhibited specimens of *Nesopimpla naranyae* collected at Kailua, Oahu, and a single specimen of *Dioctes chilonis* Cush. collected at Pearl City, Oahu. These insects were captured in rice fields during the month of June and are believed to be assisting in the control of the rice borer. *Dioctes chilonis* is one of the rice borer parasites introduced in 1928 from China by F. C. Hadden. The Nesopimpla was here before the rice borer came.

New Oribatoid mites from Hawaii.—Mr. Bryan exhibited collections of oribatoid mites, worked up by Professor Arthur P. Jacot of Shantung Christian University, that had recently been returned to Bernice P. Bishop Museum and the Experiment Station, H. S. P. A. They contain cotypes and paratypes of new species of mites described in Transactions, American Microscopical Society, vol. XLVIII, No. 1, January, 1929, and Psyche, vol. XXXV, No. 4, 1928. The new species are as follows:

Indotritia bryani Jacot, (new genus and species) from Wake I., Tanager Expedition, Aug. 2, 1923, (E. H. Bryan, Jr.). (Cotypes in B. P. Bishop Museum).

Oribotritia hawaiiensis Jacot (new species), Kaala Mts., Oahu, April, 1892, (R. C. L. Perkins); Niu, Oahu, May 27, 1909, (O. H. Swezey). (Cotypes in B. P. Bishop Museum). This was described as *Euphthiracarus* (*Indotritia*) *hawaiiensis,* the name being altered on the cotype slide.

Galumna swezeyi Jacot (new species), Kuliouou, Oahu, (O. H. Swezey), March 5, 1920. (Cotypes in Experiment Station, H. S. P. A.)

Udetaliodes hawaiiensis Jacot (new genus and species), Type locality, Mt. Tantalus, Oahu, Nov. 27, 1923 (C. E. Pemberton); Paratypes from Tantalus, Oahu, Oct. 10, 1911, Jan. 6, 1923 (O. H. Swezey); Honolulu, July 1, 1925; Molokai Mts., 3000 ft., Sept. 8, 1893 (R. C. L. Perkins); Wailuku, Maui, 2000 feet, Dec. 9, 1922 (O. H. Swezey); Iao Valley, Maui, March 22, 1924 (O. H. Swezey); Mt. Koele, Lanai, 3000 feet, Jan. and Feb., 1894, (R. C. L. Perkins).

Udetaliodes hawaiiensis wakensis Jacot, Wake Is., July 28-31, 1923, Tanager Expedition (E. H. Bryan, Jr.); Nihoa I., June 14, 1923, Tanager Expedition (E. H. Bryan, Jr.). This subspecies also occurs on Funafuti, Ellice Islands, (Cotypes in B. P. Bishop Museum).

Udetaliodes swezeyi Jacot (new species), Kaumuohona, Oahu, Dec. 5, 1907 (O. H. Swezey). (Holotype in Experiment Station, H. S. P. A.).

Erebus odora (L.)—Dr. Williams exhibited a reared specimen of the "Black Witch" (*Erebus odora*) the cocoon having been found by the yard boy of Mr. C. W. Bartlett, Woodlawn, Honolulu, among old cloth on the back porch. The cocoon hardly merits that name as it is composed of a few strands of silk through which the stout pupa is readily visible.

Pachodynerus nasidens (Latr.)—Dr. Illingworth reported that swarms of these introduced wasps were flying about the walls of greenhouses at the Experiment Station of the Hawaiian Pineapple Canners at Wahiawa, July 8, 1929. As usual they were partitioning the mud cells of *Sceliphron caementarium* and pro-

visioning their nests with small caterpillars. Many of the nests were infested with a dermestid bettle, *Eucnocerus anthrenoides* Shp. which was evidently killing the young of the wasp and devouring the storehouse of caterpillars. These beetles also evidently attack the stores of Sceliphron. Many of the mud cells were only partially filled with dead, dry spiders, with the dermestid larvae among them. Another check on the original builders is the green wasp, *Chrysis extraniens* Rohwer. Several cocoons of this species were found in the mud cells of Sceliphron, and these in turn were attacked by the dermestid beetles.

Coptotermes formosanus.—Dr. Illingworth reported that a tremendous flight of this destructive termite occurred at Kaimuki, June 19, 1929.

Mr. Swezey gave a short and interesting report of the meetings of the Pacific Slope Branch of the American Association of Economic Entomologists, of which he was chairman. These meetings were held at Berkeley, Calif., June 20-21.

AUGUST 1, 1929

The 283rd meeting of the Hawaiian Entomological Society was held at the H. S. P. A. Experiment Station at 2:30 p.m., O. H. Swezey presiding. Others present were: Messrs. Ehrhorn, Hadden, Weinrich, Illingworth, Mason, Van Zwaluwenburg, Bryan, Willard, Rosa, and Fullaway, members; and Mr. R. R. Whitten, a visitor. In the absence of the secretary, Mr. Fullaway was appointed secretary pro tem.

The minutes of the previous meeting were read and approved.

Mr. R. R. Whitten was nominated by Mr. Bryan as an active member.

ENTOMOLOGICAL PROGRAM

Messrs. Ehrhorn and Van Zwaluwenburg addressed the meeting on the subject of the 4th Pacific Science Congress held in Java during May of this year, to which they were delegates.

Erebus odora (L.)—Hatched eggs and young larvae of this species were shown by Mr. Swezey, with the information that they

were produced by a female moth secured by Dr. Lyon in the Forestry Building, July 26. She was confined in a jar over night and laid 40 eggs. The eggs, apparently laid singly, are spherical with numerous fine meridional ridges. The caterpillars hatched July 31 and are feeding on tender new leaflets of the monkey-pod tree. They are very slender, have two pairs of abdominal prolegs on the 8th segment.

Euscelis stactogalus Am.—Specimens of this cicadellid were shown by Mr. Swezey, with the information that they were collected by him on Tamarix at Davis, Calif., June 17, 1929. At the same time, *Polynema saga* (Gir.) was collected, which is parasitic on the eggs. Both of these insects were found in Honolulu for the first time in the summer of 1928.

SEPTEMBER 5, 1929

The 284th meeting of the Hawaiian Entomological Society was called at 2:30 p.m. at the Experiment Station, H. S. P. A., President Swezey in the chair. Other members attending were: Messrs. Bryan, Ehrhorn, Hadden, Illingworth, Pemberton, Rosa, Weinrich, Whitney, Whitten, Willard and Williams. Prof. M. K. Riley of the University of Hawaii was present as a visitor.

The minutes of the August meeting were read and approved as corrected.

Mr. R. R. Whitten was elected an active member.

Prof. M. K. Riley was nominated for active membership by Mr. Bryan, and Dr. H. R. Hagan of the University of Hawaii was nominated for membership by Dr. Illingworth.

Prof. Riley briefly addressed the Society, telling of his work in South Dakota, where he was particularly interested in the study of Coccidae. He stated that he expected to have considerable time for research work while in Hawaii and planned on continuing his studies of Coccidae here, if no more important research problem in entomology presented itself.

Mr. Pemberton made some remarks on his experiences in New Guinea and on New Britain Island, stating that his principal line of work while in these places was studying new sugar cane

varieties, collecting tree seeds for shipment to Hawaii, and studying insect pests attacking sugar cane in those places. He reported finding on New Britain Island, a carnivorous mosquito which might be of value in destroying mosquito larvae in Hawaii. He remained four or five months on New Britain Island studying and rearing this mosquito, several shipments of which were successfully made to Hawaii.

PAPERS

"A Spider Eating Ant Larvae or Pupae."

BY F. X. WILLIAMS

NOTES AND EXHIBITIONS

Mr. Bryan reported having received a communication from Dr. Walther Horn of Berlin, Germany, offering to work up any collection of tiger beetles that entomologists in Hawaii might care to send him.

Erebus odora (L.)—Mr. Bryan reported that Mr. William Meinecke had observed this moth very abundant about Waiohinu in the Kau district of Hawaii, where he had captured five or six specimens of the adult. Mr. Swezey also reported this moth having been observed about the Paia section of Maui.

Anaphothrips orchidii (Moulton).—Mr. Whitney reported a heavy infestation by this thrips in the orchid house of R. S. Anderson in Kaimuki. It was first thought this species was a recent immigrant, but evidence in connection with this particular infestation now indicates that the insect has been in the territory a number of years. It was described by Moulton in Tech. Series Bul. 12, Part 3, U. S. D. A., 1907, from Orchids at Fruitvale, Calif. It has also been taken from *Chamaedorea fragrans,* Ficaria and palms in Belgium (Mr. Bagnall).

Bactra truculenta Meyr.—Mr. Swezey reported having observed this nutgrass moth abundant on all the plantation districts of Maui. It was particularly effective in the nutgrass areas of the plantation about Lahaina, where about 90 to 100 per cent of the nutgrass was being affected.

Lariophagus texanus Crawf.—Mr. Swezey reported rearing this parasite from *Bruchus sallaei* in seeds of *Acacia farnesiana* collected in Ukumehame Valley, near Olowalu, Maui, Aug. 29, 1929. Apparently the first record of the occurrence of this bruchid parasite on Maui.

Syagrius fulvitarsis Pascoe.—Mr. Swezey reported that the Australian fern weevil was found to be killing off the Sadleria ferns in the Hana district of Maui about six miles northwest from the village of Hana and at an elevation of about 1200 ft., Aug. 20, 1929. The parasite, *Ischiogonus syagrii* Ful., was found present also. An examination of nine frond stalks which showed 17 exit holes of the weevil disclosed 24 clusters of cocoons of the parasite. This equals a parasitism of 58%. The weevil and parasite have both probably spread from a locality on the Ditch Trail where known to have been established several years ago, and where the parasite was introduced from Kilauea, Hawaii.

Xiphidiopsis lita Hebard.—Mr. Swezey reported collecting this phasgonurid in the forest of the Nahiku district on Maui, Aug. 20, 1929. Apparently the first record of this insect on Maui.

Copris incertus var. *prociduus* (Say).—Mr. Swezey reported having collected a specimen of this beetle at Waihee dairy, Maui, Aug. 23, 1929. Another one of the beetles came to light at the Wailuku Hotel on Aug. 25, 1929. Search was made for the beetles at Puunene dairy Aug. 26, but none was found there.

Eucymatoge orichloris Meyr.—Mr. Swezey exhibited a specimen of this moth reared from a caterpillar collected on Sideroxylon leaf on a ridge above Puu Peahinaia, Oahu, April 28, 1929. Apparently the caterpillar was full grown when found, as it did not eat any more; hence, there is doubt about Sideroxylon being its food plant. The caterpillar was of the looping type, green, slender, and with two elongate backward-projecting tubercles above anal prolegs. The pupa was formed May 2, and the adult issued May 15. The first rearing of this moth, and the first record of it on Oahu. It has previously been collected at Hilo, Olaa and Kilauea on Hawaii, and on Lanai.

OCTOBER 3, 1929

The 285th meeting of the Hawaiian Entomological Society was called at 2:30 p.m., at the Experiment Station, H. S. P. A. In the absence of the President and Vice-President, Mr. E. M. Ehrhorn was chosen chairman pro tem. Other members attending were: Messrs. Hadden, Illingworth, Mason, Riley, Rosa, Van Zwaluwenburg, Weinrich, Willard and Williams. Dr. Royal N. Chapman was a visitor.

Minutes of the previous meeting were read and approved.

Prof. M. K. Riley and Dr. H. R. Hagan were elected to active membership.

Mr. Van Zwaluwenburg read portions of a letter received from Dr. S. Leefmans of Buitenzorg, Java, Chairman of the Standing Committee on Pacific Entomology formed last May at the Fourth Pacific Science Congress. Dr. Leefmans reported that this committee had approached the authorities of the National Museum of Washington, and of the British Museum, with a view to expanding the staffs of those institutions for the purpose of expediting the determinations of parasitic Hymenoptera and Diptera. He also wrote that a letter of support had been sent to Dr. Walther Horn, endorsing the aims of his International Entomological Institute at Zurich.

Dr. Williams made a motion that the Hawaiian Entomological Society go on record as heartily supporting the work of the Standing Committee on Pacific Entomology as just reported by Mr. R. H. Van Zwaluwenburg, member of this committee. The motion was unanimously passed by those present.

It is obvious that lists of injurious and beneficial insects cannot be made without proper identifications, and we in Hawaii have long felt the need of an entomological center with a staff of specialists adequate to cope with a situation which daily becomes more difficult.

NOTES AND EXHIBITIONS

Earwigs from Japan.—Mr. Ehrhorn exhibited two earwigs from Nikko, Japan, which he had found in a cavity in the soil. The female had deposited eggs in the cavity which were also collected and exhibited.

Jassids.—Mr. Ehrhorn exhibited also a collection of Jassids which he had caught at light at Townsville, Australia, on board ship, near the dock. These he turned over for the collection of the H. S. P. A.

Dr. Williams reported on a letter from Mr. Harold Morrison, of July 16, 1929, referring to the identification of a Limnerium-like wasp that has been taken at windows, etc., in Honolulu, and also bred by Mr. Swezey from the caterpillar of *Stagmatophora incertulella* (Walk.), from Manoa Valley, April 9, 1928. The insect was submitted to Mr. R. A. Cushman, of the United States National Museum, and he reported on it as follows:

> "*Idechthis* sp., very close to (*Nemaritis*) *Idechthis canescens* (Grav.). The darker color might be due to their having developed under unusually humid conditions and, were this the only difference between these specimens and normally colored individuals of *canescens*, I would call them that species. But there is a constant difference in number of antennal joints and disposition of ocelli. The ovipositor sheath appears to be very slightly shorter. I would very much like to know the host, if any of the specimens were reared."

Carpocapsa saltitans West.—Dr. Williams exhibited, on behalf of Mr. Swezey, a specimen of the Mexican "jumping bean," the seed of *Euphorbia* sp. The movement of the bean is caused by the larva of a tortricid moth of this species.

Elateridae from Java.—Mr. Van Zwaluwenburg exhibited a collection of Elateridae obtained by him on his recent trip to Java.

Dr. Chapman in a brief talk gave an interesting description of the entomological conditions in Germany. He spoke particularly of the entomological workers in that country, describing their methods of work and their relationships with one another.

Oviposition of day mosquito.—Mr. Weinrich reported having observed a day mosquito ovipositing and that 15 eggs were deposited close together but were unattached. He stated that this mosquito usually laid a single egg, flying away before another egg was deposited. This individual, however, remained until the 15 eggs were laid.

NOVEMBER 7, 1929

The 286th meeting of the Hawaiian Entomological Society was called at 2:30 p.m., at the Experiment Station, H. S. P. A., Mr. Swezey in the chair. Other members attending were: Messrs. Ehrhorn, Hadden, Hagan, Illingworth, Mason, Pemberton, Riley, Rosa, Weinrich, Willard and Williams. Mr. W. W. Yothers, Entomologist, U. S. Department of Agriculture of Orlando, Florida, was a visitor.

The minutes of the 285th meeting were read and approved as corrected.

Mr. Yothers gave a very interesting talk describing the Mediterranean fruitfly situation in Florida. He outlined the work on research problems being conducted in that state and reported on the results of the eradication program up to date.

NOTES AND EXHIBITIONS

Stictocephala festina (Say).—Reported by Dr. Illingworth as a serious pest of alfalfa on the farm of the University of Hawaii. The insects occur in millions, girdling the stems by their feeding punctures, and seriously rupturing the bark about the base, where the eggs are laid. In the mainland United States, this insect is commonly known as the Three-Cornered Alfalfa Hopper. Its habits here agree closely with those described by V. L. Wildermuth, Journ. Agr. Research, 3, 343, (1915). Its distribution is given as Southern States; it extends to Southern California, and has gone northward to Colorado and even to Montana.

Diachus auratus (Fab.).—Specimens of this Chrysomelid were collected in considerable numbers by Dr. Illingworth, sweeping in an alfalfa field on the farm of the University of Hawaii.

Agromyza virens Loew.—Specimens of a stem-mining fly bred by Dr. Illingworth from cornflower (Centaurea) May 7, 1929, have recently been determined as belonging to this species by Dr. J. M. Aldrich, of the U. S. National Museum.

Dr. Aldrich states, "I have tried to run your species through the recent European keys of Hendel and Hering. However, when I turned to the American literature, I found it ran immediately to

virens Loew, a rather common species in the United States, and I am satisfied this is the correct name for it. It agrees well with our specimens in the museum." Specimens of this fly have been exhibited at previous meetings by Mr. Swezey, bred from Zinnia, and by Dr. Illingworth, bred as above.

Copris incertus var. *prociduus* (Say).—Mr. Ehrhorn reported having captured 20 of these dung beetles coming to light at Kalamanu, the home of G. R. Carter on the Island of Maui, October 14th to 16th, 1929. Kalamanu is 3,135 feet above sea level. This beetle was imported from Mexico in 1923 and this is the first record of its capture at high elevations in Hawaii.

Erebus odora (L.)—Mr. Ehrhorn reported a specimen of this moth being captured on Punahou Street by Mrs. Ed. Spalding, October 30, 1929.

Megarhinus inornatus Walker.—Mr. C. E. Pemberton exhibited adults and larvae of this carnivorous mosquito, introduced by him from the island of New Britain to Honolulu, July-August, 1929, to prey on other mosquitoes; it being now established on Mt. Tantalus and in upper Manoa Valley.

Haematobia irritans (L.)—Mr. Swezey called to attention that he had found in an old report by Mr. Koebele* the statement that the hornfly was first noticed by J. P. Mendonca at Kaneohe Ranch, February, 1898. In the same report it is stated that the cabbage butterfly was first noticed in Honolulu, September, 1898, and that *Pteromalus puparum* was introduced from California in 1898. Mr. Koebele says about this parasite: "Has been present on the islands for a long time, as we have bred it from the chrysalid of the native butterfly *Pyrameis tamehameha.*"

Omiodes asaphombra Meyr.—Mr. Swezey called to attention that where this moth is treated of in the H. S. P. A. Ent. Bul. No. 5, p. 21, 1907, it is an error. It was later found that the moth considered there was *Nacoleia scotaea* Hamp., described in Ann. Mag. Nat. Hist. (8), 9, p. 442, 1912. This latter species feeds on Astelia, while it has been found that *asaphombra* is attached to Joinvillea. See Proc. Haw. Ent. Soc., II, No. 3, p. 136, 1910.

* Report of the Minister of the Interior to the President of the Republic of Hawaii for the year ending December 31, 1898. (1899). Report of the Entomologist (Koebele) for 1898 on pages 78-89.

Periplaneta ignota Shaw.—Mr. Swezey mentioned that in the Bishop Museum collection there is a specimen of roach of this species as labelled by Dr. Shaw. The specimen was picked out by Dr. Shaw from among specimens of *P. americana*. It bears a label as having been collected by J. F. Illingworth in Honolulu. No date or other data. It much resembles *P. americana* but is somewhat darker, the light area on the pronotum is a different shape, and the emargination of the supra-anal lamina is different. The species is described in Proc. Linn. Soc. N. S. W., 50, p. 205, 1925.

Engytatus geniculatus Reuter.—Mr. Swezey exhibited specimens of this bug collected by him on tomato plants in the Hilo Hotel garden, October 17, 1929.

Monomorium minutum Mayr.—Mr. Swezey exhibited specimens of this tiny black ant collected by him in Hilo Hotel garden October 17, 1929. It had not hitherto been recorded from the island of Hawaii. Mr. Swezey had previously collected it in his garden in Manoa Valley, Oahu, May 5, 1929.

Megacerus alternatus Bridwell.—Mr. Swezey called to attention that this bruchid is described in Proc. Ent. Soc., Washington, 31, No. 6, p. 113, 1929. It is the bruchid infesting the seeds of *Ipomoea pes-caprae* in the Hawaiian Islands. This bruchid was first collected at Barber's Point, Oahu, December 23, 1923, by O. H. Swezey. It was recorded as *Bruchus* sp. near *coryphae* Oliv. (Proc. Haw. Ent. Soc. VI, p. 3, 1925). At the time its host was not known. A few months later, it was reared from seeds of *Ipomoea pes-caprae* in Honolulu, by E. L. Caum. September 21, 1924, Mr. Swezey collected it on the north end of the island, and at Waimanalo, February 1, 1925. On October 16, 1926, it was collected by Swezey at Kahului, Maui, the first record of it on that island. Records of these occurrences are on pages 3, 7, 8, 19, 217, 224, 374 of Proc. Haw. Ent. Soc., VI, 1925, 1926 and 1927. Since then it was collected at Nawiliwili, Kauai, March 11, 1928, and at Kanoa, Molokai, November 2, 1928, by Mr. Swezey. Mr. Hadden reports seeing the work of it at Kailua, Hawaii.

Trichodectes latus Nitzsch.—Mr. Swezey exhibited specimens of this dog louse, collected from a dog in Honolulu, September 19,

1929. Apparently this insect has not been recorded here previously, though it no doubt has been here some time, and has possibly been observed by dog enthusiasts, but not enough of a dog pest to attract attention. It is not mentioned in the Fauna Hawaiiensis, nor the Proceedings of the Hawaiian Entomological Society, neither is it mentioned by Van Dine in a list of dog pests in an early report of the Hawaii Experiment Station. It is treated by Osborn in U. S. Ent. Bull. No. 5, but it is omitted from Kellogg's list of Mallophaga taken from birds and mammals of North America in Proceedings U. S. Nat. Museum, XXII, pp. 39-100, 1899. It is mentioned in Dr. Herms' Medical and Veterinary Entomology.

Zorotypus swezeyi Caudell.—Mr. Swezey reported having received from Mr. Caudell of the U. S. National Museum the identification of specimens of this insect collected in rotten koa log on Waipio ridge, Oahu, at about 1500 ft. elevation, August 11, 1929. This is of special interest, as the species was first discovered on Kauai in 1921. It has been previously collected on Oahu by Mr. Swezey at 2600 ft. on trail to Mt. Kaala, August 14, 1927, and on Waipio Ridge, August 28, 1927. (Proc. Haw. Ent. Soc. VII, No. 1, p. 23, 1928).

DECEMBER 12, 1929

The 287th regular meeting of the Hawaiian Entomological Society was called at 2:30 p.m., at the Experiment Station, H. S. P. A., President O. H. Swezey presiding. Other members attending were: Messrs. Ehrhorn, Fullaway, Hadden, Hagan, Illingworth, Mason, Riley, Rosa, Van Zwaluwenburg, Willard, and Williams. Mr. W. W. Yothers was a visitor.

Minutes of the 286th meeting were read and approved.

The Treasurer's report for the year ending November 30, 1929, showed cash on hand December 1, 1928, $230.83; receipts for the year, $181.47; expenditures for the year, $20.56, leaving a balance on hand, December 1, 1929, of $391.74. The report was accepted, subject to audit.

The following officers were elected for the ensuing year:

President, L. A. Whitney.
Vice-President, D. T. Fullaway.
Secretary-Treasurer, H. F. Willard.

Additional members of Executive Committee:

R. H. Van Zwaluwenburg.
E. M. Ehrhorn.

PRESIDENTIAL ADDRESS

"Some Observations on the Insect Faunas of Native Forest Trees in the Olinda Forest on Maui."

BY O. H. SWEZEY.

PAPERS

"Two new species of Tigava from South America (Hemiptera-Tingitidae)."

BY CARL J. DRAKE, AMES, IOWA.
(Presented by R. H. Van Zwaluwenburg.)

"The Use of Arsenic in Mosquito Control."

BY J. F. ILLINGWORTH.

"New Species of Hawaiian Cerambycidae."

BY R. C. L. PERKINS.
(Title presented by O. H. Swezey.)

"Moths in Electric Light Globe."

BY O. H. SWEZEY.

"Status of Sugar Cane Insect Pests for the year 1929."

BY O. H. SWEZEY.

"Elateridae from New Guinea and New Britain in the Collections of the H. S. P. A. Experiment Station."

BY R. H. VAN ZWALUWENBURG

Metarrhizium anisoplioe (Metsch.) Sor.—Mr. Van Zwaluwenburg reported finding this fungus the last week in November, on *Spodoptera mauritia,* in a grassy field at the base of Rocky Hill, Punahou. At that time, a short period after a rainy spell, many larvae were present in the grass. Ten days later, infected larvae, three-fourths to full-grown, had very greatly increased in numbers, and crawling larvae were no longer in evidence, the living insects having probably attained the pupal stage. The fungus was, for the most part, in the sporulating stage. The fungus was identified by Mr. J. P. Martin, of the Pathology Department, of the Experiment Station, H. S. P. A.

A previously unrecorded host fruit of Ceratitis capitata.—Messrs. Yothers and Mason reported the finding of the larvae of the Mediterranean fruitfly in the fruits of *Wikstroemia phillyreaefolia.* On November 22, four hundred fruits were collected about five miles northeast from Pahala, Hawaii, along the roadside at an elevation of about 1000 feet. These were brought to Honolulu and placed in a cage. From November 27 to December 4, sixty larvae were obtained and up to December 18, twenty-four adults and one *Diachasma tryoni* parasite had emerged. We are indebted to Mr. Otto Degener for the identification of the host plant.

Nysius coenosulus White.—The eggs, Dr. Illingworth reported, are abundant in the flowers of the tall horseweed, *Erigeron canadensis.* The eggs were also found in the flowers of the spiny amaranth, *Amarantus spinosus,* and clusters of them are frequently crowded inside the sepals of Portulaca.

Pleurophorus parvulus Chevrolat.—Dr. Illingworth reported these beetles destroying a bed of snapdragons at Kahala. The damage was done by eating into the stem and girdling the plants just under the surface of the ground. This species was previously reported by Dr. Illingworth about the roots of pineapple plants on the island of Molokai. See Proc. H. E. S., VI, 393. This is a North American beetle. It has gone under the name *Psammodius nanus* De Geer, which is a synonym. See Proc. H. E. S., VI, 371.

New Books on Entomology.—Mr. Hadden exhibited and called to attention the following two books of recent publication, "The Principles of Systematic Entomology," by Ferris, and "Seashore Animals of the Pacific Coast," by Johnson and Snook.

Strumigenys lewisi Cam.—Dr. Williams stated that in company with Messrs. Swezey and Pemberton in November, 1929, two specimens of this rare ant were found beneath the bark of a dead tree near the large Waihii Falls back of the H. S. P. A. Forestry Station in Manoa Valley, Honolulu. This ant is slów in movement, secretive and occurs as very small colonies.

Establishment of Dioctes chilonis in Hawaii.—Mr. Fullaway reported that on July 25, 1929, a single specimen of this ichneumonid parasite of the rice borer, introduced by Hadden the previous year from China, was captured by him in sweeping rice at Pearl City, Oahu. He was not certain if the capture was reported. However, in November, half a dozen more were taken pupating in rice straw brought from the same locality and he believed there could be no doubt now about the species being established.

Epilachna corrupta Muls.—Mr. Swezey exhibited some specimens of the Mexican bean beetle that Mr. E. L. Caum had obtained at West Chester, Pennsylvania in August, 1929, while on vacation there. This pest had only recently arrived in that region.

Bruchids and their Associates.—Mr. Swezey reported having collected 37 ripe pods from bushes of *Acacia farnesiana* in Ukumehame Valley, Maui, August 29, 1929, from which the following insects were obtained between August 31 and October 30:

133 *Bruchus sallaei* Sharp
1 *Bruchus amicus* Horn
1 Scolytid
3 *Carpophilus dimidiatus* (Fab.)
6 *Lasioderma serricorne* (Fab.)
10 *Catorama pusilla* Shp.?
1 *Pyroderces rileyi* (Walsm.) Larva
10 *Uscana semifumipennis* Gir. Bruchid egg-parasites

261 *Lariophagus texanus* Crwfd. Bruchid parasites
18 *Glyptocolastes bruchivorus* Crwfd. Bruchid parasites
17 *Urosigalphus bruchi* Crwfd. Bruchid parasites
43 *Cephalonomia* sp. Parasite of Catorama or Lasioderma
2 *Sierola* sp.
3 Anthocorids, Predacious bugs.

Hymenoptera at Mud Hole.—Mr. Swezey exhibited the following Hymenoptera collected at a muddy place by a leaky hydrant at Kawela, Molokai, August 6, 1929. Some of these came for water and some to collect mud for their nests:

Apis mellifera L.
Trypoxylon bicolor Sm.
Sceliphron caementarium (Drury)
Anoplius luctuosus (Cr.)
Scolia manilae Ashm.
Polistes fuscatus var. *aurifer* Sauss.
Polistes hebraeus (Fab.)
Odynerus nigripennis (Holm.)
Odynerus purpurifer Perkins
Pachodynerus nasidens (Latr.)

Hister bimaculatus (L.)—Mr. Swezey reported finding adults and larvae of this histerid beetle in cow dung at Kaunakakai, Molokai, August 6, 1929. Apparently the first record of its occurrence on Molokai.

Lophocateres pusillus (Klug).—Mr. Swezey exhibited specimens of this cucujid beetle collected by him in a package of pop corn in company with *Silvanus surinamensis* (L.), *Calendra oryzae* (L.), and *Carpophilus dimidiatus* (Fab.). There were eight specimens of *L. pusillus,* which has not previously been reported in Honolulu. In U. S. D. A. Farmers' Bulletin 1260, p. 32, 1922, it is called the Siamese grain beetle, which was reported as occurring in South Carolina and Texas. It was first noticed in U. S. A. in exhibits of rice and cereals from Siam, Liberia and Ceylon at the World's Columbian Exposition.

JANUARY 2, 1930

The 288th meeting of the Hawaiian Entomological Society was held at 2:30 p.m., at the Experiment Station, H. S. P. A. In the absence of the president and the vice-president, Otto H. Swezey was selected to act as president pro tem. Other members present were: Messrs. Ehrhorn, Hadden, Hagan, Illingworth, Rosa, Van Zwaluwenburg, Weinrich, Willard and Williams.

The minutes of the 287th meeting were read and approved.

Upon motion by Mr. Ehrhorn, a unanimous vote of thanks was extended to Mr. Swezey, the editor of the Proceedings, for his painstaking and efficient work during the past year.

The secretary read a communication from the Zoological Society of London, requesting financial assistance in the publication of the "Zoological Record." Upon motion by Mr. Hadden, it was voted to authorize the secretary to receive contributions for this purpose and forward them to the Zoological Society of London.

PAPERS

"Two New Species of *Anchastus* (Elateridae) from Fiji and Hawaii."

BY R. H. VAN ZWALUWENBURG.

"Notes on Some Bugs Associated with Pineapples in Hawaii."

BY J. F. ILLINGWORTH.

NOTES AND EXHIBITIONS

Deinocossonus sp.—Mr. Swezey exhibited specimens of what appears to be a new cossonid beetle of the genus Deinocossonus. A series of 63 beetles were collected by him and Dr. Williams, December 1, in Haleauau Valley, Oahu, from dead twigs of Pteralyxia. A single example of the tree was found, it being a new locality for the tree, which might be a new species. No fruits were obtainable by which to distinguish the species. Larvae of the beetle were also found numerous in the inner bark of dead or dying twigs. The beetles collected are larger than *D. nesiotes* described from the Waianae Mts., Kauai and Kilauea by Dr. Perkins. They

are uniformly black, too, whereas *nesiotes* has only black head and rostrum, the thorax and elytra being brownish.

Mysticomenus tibialis Sharp.—A specimen of this carabid beetle was exhibited by Mr. Swezey. It was captured by him in dead frond of tree fern (*Cibotium chamissoi*) at the top of Puu Kalena, Waianae Mts., December 29, 1929. The species was first collected by Dr. Perkins in February, 1896, at 2000 ft., lee side, Waianae Mts. Apparently it has not been collected since. There are ten specimens at the Bishop Museum. The species is readily distinguished by the pale elytra with irregular black markings.

Plagithmysus giffardi Perkins.—Two specimens of this longicorn beetle were exhibited by Mr. Swezey. They were reared by him from larvae in Smilax stems, collected at Kilauea, Hawaii, October 14, 1929. This species was collected in numbers by Mr. Giffard on Suttonia trees at Kilauea, which he took to be the host tree. None was reared, however, at that time. Apparently this is the first record of actually rearing this beetle.

Plagithmysus vitticollis Sharp.—A specimen of this longicorn beetle was exhibited by Mr. Swezey, having been reared by him from the stem of *Rubus hawaiiensis* collected on the Upper Hamakua Ditch trail, Kohala Mts., Hawaii, October 6, 1929. This also is apparently the first record of actually rearing the beetle, but specimens were collected on Rubus by Dr. Perkins, and on Perrottetia by Mr. Giffard.

FEBRUARY 6, 1930

The 289th regular monthly meeting of the Hawaiian Entomological Society was called to order at 2:30 p.m., at the Experiment Station, H. S. P. A., by the president, L. A. Whitney. Other members attending were: Messrs. Ehrhorn, Hadden, Hagan, Illingworth, Riley, Rosa, Swezey, Van Zwaluwenburg, Willard and Williams. Mr. W. W. Yothers was a visitor.

The minutes of the previous meeting were read and approved.

PAPERS

"The Pelagic Halobates."

BY FRED C. HADDEN.

NOTES AND EXHIBITIONS

Coccus longulus (Doug.)—Mr. Hagan exhibited specimens of the lima bean plant that he had collected in Wahiawa and that were infested by this scale insect.

Chloridea obsoleta (Fab.)—Mr. Swezey reported finding larvae of this moth in ears of green corn. Three of four ears had been attacked at tip. This is the first time he had found larvae of this species attacking corn, although it is known as the corn ear-worm.

Diaeretus rapae (Curt.)—Three specimens of this braconid were exhibited by Mr. Swezey, who had reared them from parasitized aphids found on a cauliflower from California. It is a parasite that has been known in Hawaii for a long time, parasitizing aphids on cabbage. This incident illustrates how the parasite could have arrived here originally.

Plagithmysus solitarius Sharp.—Two specimens of this longicorn beetle were exhibited by Mr. Swezey, having been reared by him from larvae collected under bark of a fallen Elaeocarpus tree in Haleauau Valley, Waianae Mts., Oahu, December 1, 1929. The tree contained many of the larvae. Some were collected, and ten were placed in borings in a fresh block of wood. The two specimens exhibited issued on January 25 and February 3, respectively. This is the first record of this tree as a host for this species of beetle. Mr. Swezey had previously reared it from Ohia ha on the Pupukea-Kahuku trail, September 18, 1926.

Litomastix floridana (Ashm.)—Mr. Swezey exhibited a caterpillar of *Plusia chalcites* Esp. that was packed full with the pupae of this parasite. After this parasite was discovered to be prevalent in Honolulu about a year ago, Plusia became scarce, the larvae seldom seen. During October to December of 1929, an occasional Plusia caterpillar was found and reared to ascertain whether parasitized or not. None of them contained the parasite, how-

ever. The first recent recovery was a caterpillar collected January 8, 1930, at the Experiment Station, H. S. P. A., grounds, which died January 18 before becoming full-grown, and was found to contain 16 larvae of the parasite. Similarly, a caterpillar collected in Manoa, January 30, died February 2, when half-grown, and was found to contain 90 parasite larvae. The parasitized caterpillar exhibited was collected on Datura at the Exp. Station, H. S. P. A., January 25, spun up when full-grown, and showed to be parasitized February 1. Adult parasites were observed on the Datura bush at time of collecting the caterpillar; a parasite was also observed on a geranium in Manoa recently; a few adult parasites were also collected in sweeping on alfalfa at the University of Hawaii farm, January 5, 1930. Thus it is seen that the parasite is maintaining itself in Honolulu, and it is to be hoped that it will be found established on the other islands where colonies were sent last year.

Hibiscus bud midge.—Mr. Swezey exhibited fragments of a cecidomyid reared from Hibiscus buds. The buds were from a dark pink variety having dark red center, grown by Mrs. Hansen at Kealia, Kauai. They were brought in by Mr. Barnum on September 25, 1929, having been handed to him by Mr. Duvel while on Kauai. The buds of this particular variety were said to be badly affected, falling off before opening. Full-grown larvae were found in the buds when examined. The adults from these issued and became spoiled before being observed, but enough fragments were obtained to determine it as a cecidomyid which has not previously been observed here. The nearest to it found in literature so far is a species in cotton buds (*Contarinia gossypii* Felt) occurring in Barbados and the Virgin Islands (Ent. News, 19, p. 210, 1908; and Virgin Islands, Bul. 3, pp. 17-18, 1923).

Bruchophagus funebris (Howard).—Mr. Swezey exhibited a specimen of the alfalfa seed-chalcis collected by him at Kaunakakai, Molokai, January 25, 1929. A single specimen was obtained in an alfalfa field. It is the first record of its occurrence in the Hawaiian Islands. Mr. Timberlake had recently verified its identity.

Trichogramma minutum Riley.—Mr. Swezey reported having sent slide mounts of egg-parasites reared from eggs of *Bactra*

truculenta Meyrick, *Spodoptera mauritia* Boisd. and *Lycaena boetica* (L.) to Timberlake for study. In a recent letter Mr. Timberlake expresses his opinion that these are all *Trichogramma minutum*. Specimens of a Trichogramma that was introduced along with *Trichogramma japonicum* Ashm. from Japan in 1928 were also sent, and Mr. Timberlake considered them *minutum* also. This is the species that has been reared from quite a number of species of moth and butterfly eggs in Hawaii. It varies considerably in coloration and size; also in the degree of shading on basal third of front wing, sometimes none of this.

Erebus odora (L.)—An undersized specimen of the "black witch" moth was exhibited by Mr. Swezey which was reared from the egg. A female was captured in the Bishop Musuem, October 31, 1929, and laid a few eggs which hatched November 9. The freshly hatched caterpillars had abdominal prolegs only on abdominal segments 5 and 6. After the first molt on November 14, there were four pairs of abdominal prolegs on segments 3 to 6, the two anterior pairs smaller and not functional. The second molt was November 18, and then all prolegs functional; length now 32-35 mm. The third molt was November 20-21; length 60 mm. On November 25, one caterpillar spun up between leaves; pupated November 28 (length 32 mm.); adult issued December 18. On November 29, two caterpillars spun up; adults issued December 22 and 23. December 6, one spun up; adult December 29. The last larva spun December 20; the pupa died. Other larvae died at different times. The largest larva measured was 70 mm. Only three molts were observed. The caterpillars were fed on tender leaves of monkeypod tree. Life cycle: egg 9 days; larval stage 19-41 days; pupa 20-23 days. Egg to adult 48-59 days.

Hawaiian Psocidae.—Dr. Williams mentioned that of 12 species of Hawaiian Psocidae submitted to Mr. Nathan Banks for identification, six were new, as follows*:

1. *Echmepteryx costalis* Banks.
2. *Cyptophania hirsuta* Banks.
3. *Echmepteryx marmorata* Banks.
4. *Caecilius analis* Banks.
5. *Hageniola solitaria* Banks.
6. *Psylloneura williamsi* Banks.

* Described on pages 437-440 following. [Editor.]

C. hirsuta and *C. analis* are often very common in sugar cane fields and *C. hirsuta* and *P. williamsi* sometimes moderately so.

The widely distributed *Hemipsocus roseus* Hagen, rather large, pale brown and with speckled wings is probably the commonest psocid in Hawaiian cane fields, at least on Oahu.

Phaenobremia meridionalis (Felt).—Dr. Williams reported on the identification of the cecidomyid midge in Hawaii that devours aphis, and was reared from the sugar cane aphis by Mr. H. T. Osborn in 1919. The midge is a predator on many kinds of aphis and is found both in Europe and America. Mr. H. F. Barnes of the Rothamsted Experiment Station, Harpenden, England, who determined this midge, has recently published an annotated list entitled: "Gall Midges (Dipt. Cecidomyidae) as Enemies of Aphids," in Bull. Ent. Res. XX, pp. 433-442, 1929.

Scale Insects Attacked by Fungus.—Mr. Ehrhorn exhibited specimens of plants on which were *Coccus viridis* (Green), *C. longulus* (Doug.) and *Saisettia nigra* (Nietn.) badly attacked by fungus, probably *Entomophthora pseudococci.* He stated that the wet season has been very favorable for the development of this fungus and that the same condition had been noted two years ago owing to favorable moisture conditions. This fungus also attacks *Trionymus sacchari* (Ckll.).

Elateridae from New Guinea.—Mr. Van Zwaluwenburg exhibited a collection of Elateridae from New Guinea, the majority of which had been collected by Mr. Pemberton. Several species had been described by him as new and he stated that this collection was the subject of a paper to be published in the Proceedings for the year 1929.

Chilo simplex (Butl.)—Mr. Whitney reported finding larvae of this rice stem borer in rice straw used as packing material for persimmons coming to Hawaii from Japan by mail.

MARCH 6, 1930

The 290th regular meeting of the Hawaiian Entomological Society was called to order by the Secretary at 2:30 p.m., at the

Experiment Station, H. S. P. A. Members present were: Messrs. Chock, Ehrhorn, Hadden, Illingworth, Riley, Rosa, Swezey, Weinrich, Willard and Williams. Dr. G. Cassidy of the H. S. P. A. staff was a visitor. O. H. Swezey was selected to act as president pro tem.

Minutes of the 289th meeting were read and approved.

The secretary announced that he had forwarded to the Zoological Society of London a post office money order for 4 pounds 14 shillings 6 pence, which represented voluntary contributions by members to assist in paying for the publication of the Zoological Record.

Mr. Swezey, the editor of the Proceedings, announced that the Hawaiian Sugar Planters' Association had paid the bill for printing Volume VII, No. 2, of the Proceedings. Upon motion by Mr. Ehrhorn, it was unanimously voted that the secretary write a note of thanks to the Hawaiian Sugar Planters' Association and express to them appreciation for their continued support.

Dr. Cassidy, who had just returned from a trip around the world, gave a very interesting talk about her experiences en route, particularly in Japan, Java and India. During the whole trip, she spent considerable time and effort collecting nematode material in each country visited. This material has already produced many new species of nematodes.

NOTES AND EXHIBITIONS

Erebus odora (L.)—Mr. Ehrhorn exhibited two half-grown caterpillars of this moth which he had found on the trunk of a monkey-pod tree on Alewa Heights, February 25. They were in the cracks of the rough bark and hard to detect because the color was somewhat like the bark. These are the first living larvae found out of doors.

Protoparce quinquemaculata blackburni (Butl.)—Dr. Williams exhibited a female specimen of this moth that was secured as a larva by Mr. Swezey, on Molokai in February, 1929, that had remained in the pupal stage for about a year, issuing in February, 1930.

Pittosporum moth.—Mr. Swezey exhibited a series of a new species of moth reared from leaves of Pittosporum collected on Puu Kalena, Waianae Mts., Oahu, December 29, 1929.

Agromyza virens Loew.—A specimen of this fly was exhibited by Mr. Swezey, which he had reared from stems of Gnaphalium collected at the corner of Wilder Avenue and Keeaumoku Street, Honolulu, March 1, 1930. This is a host plant for this insect, not previously reported in Honolulu.

Phloeophagosoma tenuis (Gemm.)—A series of this beetle was exhibited by Mr. Swezey, having been collected by him in a rotten log of monkey-pod at the Waipio H. S. P. A. substation, February 28, 1930. It is a native beetle that has not been much collected of recent years. At the Bishop Museum is a single specimen collected by Mr. G. P. Wilder at Ulupalakua, Maui. Mr. Swezey had collected one specimen in rotten kukui wood in Ukumehame Valley, Maui, August 29, 1929.

Callithmysus microgaster (Shp.)—Mr. Swezey exhibited two fine specimens of this native beetle that issued from a block of wood of Bobea tree brought in from Waikane, Oahu, January 19, 1930. The beetles issued March 4. The tree from which the wood was taken was one that had recently died and was in just the right condition so that larvae of this beetle were numerous under the bark, many of them nearly full-grown.

APRIL 3, 1930

The 291st Regular Meeting of the Hawaiian Entomological Society was called to order at 2:30 p.m. by the President, L. A. Whitney, at the Experiment Station, H. S. P. A. Other members present were: Messrs. Bryan, Chock, Ehrhorn, Fullaway, Hadden, Hagan, Illingworth, Mason, Pemberton, Riley, Rosa, Swezey, Van Zwaluwenburg, Wilder, Willard and Williams.

The following visitors were present: Dr. W. Dwight Pierce, Dr. Walter Carter, Dr. G. Cassidy and W. W. Yothers.

The minutes of the 290th meeting were read and approved.

The list of common names of insects sent by the American Association of Economic Entomologists to its members for ap-

proval was brought to the attention of those present. After considerable discussion, the secretary was asked to write to the above-mentioned association and express the disapproval of the Hawaiian Entomological Society to the following three proposed common names: Hawaiian Melon Fly, Japanese Rose-Beetle, Sugar-cane Weevil.

Dr. W. Dwight Pierce, who had just completed a three-year stay in the Philippine Islands, where he had been studying insects affecting sugar-cane, was called upon for a few remarks. Dr. Pierce gave a very interesting address on his observations of sugar-cane insects in the Philippines and described methods of dealing with these insects.

MAY 1, 1930

The 292nd regular meeting of the Hawaiian Entomological Society was held at the usual place at 2:30 p.m. with President Whitney in the chair. Other members present were: Messrs. Bryan, Carter, Ehrhorn, Hadden, Hagan, Illingworth, Pemberton, Rosa, Swezey, Van Zwaluwenburg and Weinrich. The following visitors were present: Dr. W. M. Wheeler, Dr. G. H. Godfrey, J. L. Collins, J. R. Cox and Dr. J. W. Chapman.

In the absence of the secretary, Mr. Swezey was called on to serve.

The minutes of the previous meeting were read and approved.

Dr. Walter Carter was elected to active membership.

NOTES AND EXHIBITIONS

Athesapeuta cyperi Marshall.—Mr. Van Zwaluwenburg reported having found this introduced weevil in a nutgrass patch at Puuloa, near the railroad station, April 7, 1930. It is the farthest from the Exp. Station that it is known to have spread on Oahu.

Unidentified longicorn beetle.—Mr. Rosa exhibited a specimen of beetle collected by him at light in Nuuanu Valley, March 18, 1930, it being the second specimen of this immigrant longicorn collected in Honolulu, the first one having been collected by J. A. Kusche May 7, 1919. Its habits are not known.

Chaetodacus cucurbitae (Coq.)—Mr. Whitney reported that males of the melon fly were attracted in numbers to the orchid *Dendrobium superbum.*

Fiorinia fiorinae (Targ.)—Mr. Ehrhorn exhibited a Macadamia leaf infested with this scale.

Acythopeus aterrimus (Waterh.)—Mr. Swezey reported that a specimen of this beetle had been sent in from Hilo, Hawaii, by Mr. L. W. Bryan, April 19, 1930, where it was collected in an orchid house. It is the first record of its occurrence on the island of Hawaii.

Mr. E. H. Bryan, Jr., who had recently returned from several months study at Stanford University, brought greetings from the entomologists of that University, University of California, and the California Academy of Sciences.

Dr. W. M. Wheeler was called on by the chairman, presented greetings from the Harvard University entomologists. He mentioned the change by which the Entomology Dept. of Bussey Institute has been transferred to the Museum of Comparative Zoology at Harvard. He spoke of the length of time that he had been connected with Bussey Institute and mentioned that 45 entomologists had taken their Ph.D. there during that time. At the present time, they have twelve promising Ph.D. students. Dr. Wheeler spoke of the interest there in establishing several tropical stations in South America. Probably one will be established on the Amazon. Already there are stations at Barro Colorado Island, Canal Zone and at Soledad, Cuba. The advantages were portrayed of students attending these stations as part of their work, for which they obtained due credit. In general discussion on ants, Dr. Wheeler mentioned that he contemplated a revision of the ant fauna in Hawaii. He described how the Argentine ant had replaced *Pheidole megacephala* in the Madeira Islands.

Dr. J. W. Chapman, responding to invitation of the chairman, explained that he was just passing through by steamer from the States where he had been on year's leave, and was now returning to the Philippines. He has been in school work on Negros for fourteen years. He mentioned that entomological problems were very numerous in the Philippines, too many to be solved very soon.

Dr. Walter Carter, who had recently joined the staff of the Pineapple Experiment Station, gave some comparisons with conditions where he had previously worked in the Western States with what he finds since his arrival in Hawaii. He recounted some phases of his previous work with the sugar beet leafhopper in relation to transmission of virus from many different plants in the Western States. Many garden crops are now known to be affected by the same kind of virus. He considered that insect transmission involved the main, or soon to be, the most important problems of the entomologists. Resistant varieties is an important solution of the curlyleaf problem with sugar beets. Another solution is to be prepared with a repellant at the time of arrival of a migration of the leafhoppers. The use of soil surface temperature instruments is of importance in determining the critical time.

JUNE 5, 1930

The 293rd meeting of the Hawaiian Entomological Society was called to order at 2:30 p.m., at the Experiment Station, H. S. P. A., by the President, L. A. Whitney. Other members attending were: Messrs. Bryan, Ehrhorn, Hagan, Illingworth, Pemberton, Rosa, Swezey, Van Zwaluwenburg, Weinrich, and Willard.

The minutes of the 292nd meeting were read and approved after minor corrections.

Mr. Bryan read a communication from C. F. Sanborn, entomologist at the Oklahoma Agricultural College, inquiring about collections of ticks in Hawaii. Discussions brought out the fact that there were very few specimens of ticks in insect collections in the islands.

PAPERS

"Miscellaneous Notes."

BY O. H. SWEZEY.

"An Egg-parasite of Thrips in Hawaii."

BY C. E. PEMBERTON.

Paratenodera sinensis (Sauss.)—Mr. Bryan reported that he had been informed by Mr. Will Cooper, of Cooper's Ranch Inn, Hauula, Oahu, that on May 13, 1930, a number of specimens of praying mantis had been taken from Honolulu to the ranch to prey on grasshoppers which were damaging the flowers of Hibiscus and other ornamental plants.

Psychoda sp.—Dr. Illingworth exhibited several specimens of a large moth-like fly captured at Makiki, by Mr. Gerrit P. Wilder. This is apparently a new immigrant to the islands. Specimens collected on Tantalus, May, 1929, are in the collection of the H. S. P. A.

Geotomus pygmaeus Dallas.—Dr. Illingworth reported this small, black bug flying to light at Kaimuki in considerable numbers. They became a nuisance in the house during May by crawling into clothing, and in several instances piercing the skin with the proboscis; their odor, too, is vile. Dr. Perkins first collected this species on Molokai in 1893. Dr. Illingworth again collected it on that island in 1926, where he found it in soil about pineapple roots. See Proc. Haw. Ent. Soc. VI, 392. It is supposed to suck the sap from roots of grasses and other plants.

Coluocera maderae Wollaston.—Dr. Illingworth reported that this tiny beetle, belonging to the family Lathridiidae, was found in considerable numbers in nests of the crazy ant, *Prenolepis longicornis* Latr., at Koko Head, Oahu, Dec. 10, 1922. Specimens were submitted several times to specialists for determination without result. Dr. Wheeler again examined the original specimens, during his visit to Honolulu, May 12, 1930, and was able to place it as above. It is listed in Kritisches Verzeichniss der Myrmekophilen und Termitophilen Arthropoden, E. Wasmann, p. 133, Berlin, 1894. Mr. Illingworth took Dr. Wheeler to the original locality back of Koko Head, May 14, 1930, where these beetles were again found. They apparently only occur in the nests of this species of ant. It would be interesting to know how such an insect gained entrance into the Island. Evidently it must have arrived with a colony of its host.

Xylocopa varipuncta Patton.—Mr. Ehrhorn exhibited photos of *Xylocopa varipuncta,* showing all stages of development, which he found in a dead Hibiscus trunk. The ball of pollen, young larva and full-grown larva, pupae and adult were photographed by R. J. Baker of Honolulu.

Ptinid in cardboard.—Mr. Swezey exhibited a large piece of cardboard which had been received in registered mail from Pusa, India, it being used as a stiffener in mailing a photograph. This cardboard was found badly infested with a small ptinid beetle different from any known in Hawaii. It was fumigated and specimens preserved.

Coptotermes formosanus Shiraki.—Mr. Van Zwaluwenburg reported that many persons believed that termites did not feed on the wallboard called "Celotex." He stated that "Celotex" placed in a cage with a colony of *Coptotermes formosanus* was readily eaten by these insects.

Porthetria dispar (L.).—Mr. Whitney exhibited preserved specimens of two half-grown gipsy moth larvae which had been taken at Honolulu recently from plants of the ornamental Maple growing aboard the steamer *Taiyo Maru* en route from Japan. These specimens were living when taken and their capture illustrates the ease with which destructive insect pests may be transported from one part of the world to another.

Electrical Device for Killing Insects.—Mr. Whitney exhibited a device for killing insects through electrocution. The theory of the device was to attract insects to a light that was surrounded by electrically charged wires. When the insects came in contact with the wires, they were supposed to be killed by the electric current. A test of the device, by placing roaches and flies on the wires, showed that the voltage was not high enough and the insects were stunned, but not killed.

JULY 3, 1930

The 294th regular meeting of the Hawaiian Entomological Society was held at 2:30 p.m. in the entomological laboratory of the Experiment Station, H. S. P. A., President Whitney presiding.

Other members present: Messers. Bryan, Ehrhorn, Illingworth, Mason, Rosa, Swezey, Wilder and Van Zwaluwenburg. Mr. F. A. Bianchi was a visitor.

In the absence of Secretary Willard, Mr. Swezey was appointed Secy. pro tem.

PAPERS

"Manson's Eye-worm Distributed by English Sparrows."

BY J. F. ILLINGWORTH

In discussion, Mr. Ehrhorn related several instances of dwellings being infested by chicken mites on account of nests of the mynah bird. Other members gave similar instances.

NOTES AND EXHIBITIONS

Scymnus ocellatus Sharp.—Dr. Illingworth reported this lady-beetle as a valuable enemy of mealybugs on pineapples, having destroyed many of them in his cages.

Carpophilus maculatus Murray.—Mr. Bryan exhibited a series of these nitidulid beetles and their larvae which had been found infesting walnuts at Schofield Barracks, Oahu. The beetles had riddled the walnuts, which had been kept in a box, but had not attacked almonds in the same box.

Bruchus limbatus Horn.—Mr. Bryan exhibited a series of these bruchid beetles which had been infesting the seeds of *Acacia confusa* on the Honolulu Plantation, Oahu. The specimens had been brought to Bishop Museum by Gerrit P. Wilder, June 30, 1930.

Amorbia emigratella Busck.—Mr. Bryan reported this tortricid moth having been bred from a caterpillar which was found boring into the seed capsule of an orchid (Phais) belonging to Gerrit P. Wilder.

Diocalandra taitensis (Guer.).—Adults, grubs and examples of the borings of the Tahiti coconut weevil were exhibited by Mr. Bryan. They had been obtained from the husk of a dry coconut from Judd St., Honolulu, brought to the Bishop Museum by Gerrit P. Wilder. This weevil, when found in Hawaii, usually

bores into the spathe of coconut inflorescence and in the bases of petioles rather than the nuts.

Prognathogryllus alatus Brunner or new species.—Mr. Bryan exhibited a male specimen of this native tube-inhabiting cricket, collected April 18, 1930, by Wm. H. Meinecke on the ridge between north and south Halawa valleys, Oahu, where the ridge begins to narrow and drop to form a saddle (elevation about 1700 feet), on the leaves of "mokihana" (*Pelea* sp.).

Coleoptera from Tahiti.—Mr. Wilder exhibited some large beetles which he had collected in Tahiti: *Xystrocera globosa* (Oliv.), a brenthid, a large cerambycid; also a large green bug.

Porthetria dispar (L.).—Mr. Whitney exhibited a male gipsy moth bred from a pupa found on juniper on a steamer June 6th, the moth having issued June 22nd. He also exhibited a tortricid moth bred from a pupa on boxwood on the *Shinyo Maru,* June 28, 1930. Considerable discussion was had on the difficulties arising on account of plants used as ornamentals on steamers.

Tetramorium simillimum (Smith).—Mr. Swezey exhibited specimens of an ant from a nest in the ground in a cane field at Waianae Plantation, Oahu, June 18, 1930, which are apparently this species, of which the only specimens in the collections here are three at the Bishop Museum in the Fauna Hawaiiensis collection, recently separated by Dr. Wheeler from a series of *Tetramorium guineense* (Fab.). It had not been recorded here previously.

Bruchus limbatus Horn.—Specimens of this bruchid were exhibited by Mr. Swezey, having been reared by him from seeds of the monkeypod tree collected at Paia, Maui, May 27, 1930. It appears to be the first record of this beetle on Maui.

Agromyza virens Loew.—Mr. Swezey exhibited specimens of this little agromyzid, reared from stems of *Bidens pilosa* and *Ageratum conyzoides* at Waianae Plantation, June 24, 1930. These are new hosts for it here, and the first time it has been found so far away from Honolulu, where it has been known for about two years.

Anagrus sp.—Mr. Swezey exhibited specimens of an unknown mymarid, recently reared from the eggs of the amaranth jassid in Honolulu. The first specimens reared were by Mr. Pemberton on June 20, 1930. They issue quite abundantly from the jassid eggs in leaf petioles of spiny amaranth. It is different from any species previously recorded here.

AUGUST 7, 1930

The 295th regular meeting of the Society was held in the usual place. Those present were: Messrs. Bianchi, Bryan, Carter, Ehrhorn, Fullaway, Illingworth, Mason, Rosa, Swezey, Weinrich, Williams and Van Zwaluwenburg. In the absence of the president and vice-president, Mr. Van Zwaluwenburg was called on to preside, and filled the chair until Vice-President Fullaway arrived later. In the absence of the secretary, Mr. Swezey was appointed secretary pro tem.

Minutes of previous meeting were read and approved.

Messrs. F. A. Bianchi and Sung Hin Au were elected to active membership.

NOTES AND EXHIBITIONS

Oriental cricket.—Mr. Ehrhorn related the recent taking in quarantine inspection by Mr. Whitney of a large singing cricket in small cage, from a passenger on a steamer from the Orient.

Neoclytarlus filipes (Sharp)—Mr. Swezey reported that Dr. Perkins had identified as this species a series of cerambycid beetles that Dr. Williams had reared from dead *Maba sandwicensis* collected along the road through Puuwaawaa Ranch, Hawaii, at about 2000 ft. elevation, August, 1929. It is a species that both Blackburn and Perkins collected on *Sophora chrysophylla,* a tree that occurs in the same region.

Rhyncogonus simplex Perkins.—Mr. Swezey reported on the identification by Dr. Perkins of three specimens of this curculionid beetle, collected at Koko Head, Oahu, January 11, 1928, by F. C. Hadden. In a recent letter Dr. Perkins says, "I have examined these specimens very carefully and at present am unable to separate them from the variable *R. simplex,* found on the lower

slopes of the Molokai Mts. I had many *simplex* and there was a curious sort of dimorphism in the species. . . . In some the hairs were more scale-like than in others, and this applied to both sexes, but as I obtained many specimens *in cop.,* I was able to prove that the pairs often consisted of male of one form and female of the other." There are no specimens of *Rhyncogonus simplex* at the Bishop Museum.

Ceratitis capitata Wied.—Mr. Swezey reported having reared the Mediterranean fruitfly from an infested fruit of *Scaevola gaudichaudiana,* brought in from the Manoa Arboretum, July 10, 1930, by E. L. Caum. This is a native tree and a new host record for the Mediterranean fruitfly in Hawaii.

Systole geniculata Förster.—Specimens of this eurytomid were exhibited by Mr. Swezey, who had reared them from seeds of fennel collected at a labor camp at Ewa Plantation, July 16, 1930. From a small handful of the seed clusters brought in, 12 of this seed-chalcid issued between July 18 and 22. There also issued 56 *Tetrastichus* sp. between July 18 to 30. The latter is no doubt a parasite of the former, for a very closely related species (*Tetrastichus bruchophagi*) is known to be parasitic on *Bruchophagus funebris* (How.) in California and elsewhere. This is the first record of both these species in the Hawaiian Islands. Last January Mr. Timberlake wrote of having received a *Bruchophagus* sp. bred from fennel seeds in New Zealand, and suggested that it be looked for here. As here shown, it was found at the first opportunity. The material was sent to Mr. Timberlake for determination, and he finds that Tetrastichus and Systole are the same that he had from New Zealand, and that our Tetrastichus is but slightly different from *T. bruchophagi* Gahan. His material had been referred to Mr. Gahan at the U. S. National Museum and the determinations are on his authority. Bruchophagus has been found to be a synonym of Systole.

Prolonged hibernation.—A small moth (whose identity is yet unknown) was exhibited by Mr. Swezey which had matured July 24, 1930, from a larva collected July 21, 1929, in stem of Eragrostis grass on the trail leading up to Mt. Kaala, Waianae Mts., Oahu. He and Mr. Fullaway had collected at that time a score or more of the larvae in their cocoons spun up in the grass stems

where they had fed. It is just over a year before the first moth matured, and examination shows that the others are still in larval stage in the pieces of grass stem. This is a remarkably long period for a prepupal stage of a moth in the Islands, where usually there are successive broods throughout the year.

Argyroploce illepida (Butler).—Mr. Fullaway gave an account of his recent trip to the Orient in quest of parasites for the litchi borer (*Argyroploce illepida*). He had worked in the vicinity of Canton, China, where many litchi fruits were found infested. No parasites were found here, though the borer seemed to be kept in check. Some other insects were more injurious. A leafhopper was the most prominent. Finding that search for these parasites was futile in Canton, he went to Japan to work on Adoretus parasites. The parasitism of the beetles of *Popillia japonica* by the tachinid *Ochromeigenia ormioides* was found to be very low—only about 1 to 2%. However, a large quantity of beetles was obtained from which, en route, 120 of the tachinids issued and were brought alive to Honolulu for liberation. These flies carried well in clean empty cage with no plants or other objects inside, and fed regularly.

SEPTEMBER 4, 1930

In the absence of the president and vice-president, the 295th meeting of the Hawaiian Entomological Society was called to order by the secretary at 2:30 p.m., at the Experiment Station, H. S. P. A. Mr. Ehrhorn was selected to act as chairman for the meeting. Other members present were: Messrs. Bianchi, Bryan, Carter, Chock, Ehrhorn, Hagan, Illingworth, Mason, Riley, Rosa, Swezey, Van Zwaluwenburg, Weinrich, Willard and Williams. Dr. A. C. Baker, in charge of Tropical and Subtropical Plant Insect Investigations, Bureau of Entomology, Washington, D. C., and Mrs. A. C. Baker were visitors.

Minutes of the 294th meeting were read and approved as corrected.

Dr. R. N. Chapman was elected to active membership in the Society.

Dr. Carter asked for information regarding the different classes of membership in the Society and suggested it might be advisable to have an associate membership to take care of graduate students and others who might not be able to meet the expense of active membership. Upon motion by Dr. Carter, it was voted to refer this matter to the Executive Committee.

Upon motion by Mr. Swezey, it was voted that the annual outing of the Society be held September 14th, the members assembling at the H. S. P. A. Experiment Station at 8:00 a.m., and that the outing consist of a trip to Haleauau Valley and Mount Kaala.

NOTES AND EXHIBITIONS

Cryptorhynchus mangiferae (Fab.).—Mr. Swezey reported that he had examined the seeds of mangoes eaten in June of this summer to determine whether infested by the mango weevil. Of 50 seeds examined, 40, or 80% of the seeds contained either a larva, pupa, or adult of the weevil. In one instance there were three in one seed. Apparently the eating qualities of the fruits were not impaired by the weevils in the seeds.

Dr. Williams exhibited and called to attention a book entitled "The Witchery of Wasps," by Edward G. Rinehard. Dr. Williams read from the book the foreword by Dr. L. O. Howard.

Dr. A. C. Baker gave a very interesting talk on the campaign against the Mediterranean fruitfly in Florida. His talk was of special interest to those present and gave information on many phases of the work about which little was known heretofore in Hawaii.

OCTOBER 2, 1930

The 297th meeting of the Hawaiian Entomological Society was called to order at 2:30 p.m. by the President, L. A. Whitney, at the Experiment Station, H. S. P. A. Other members present were: Messrs. Bryan, Carter, Ehrhorn, Rosa, Swezey, Weinrich, Wilder, Willard, Williams. The following visitors were present: A. C. Baker, Mrs. A. C. Baker, O. C. McBride, C. B. Keck and T. R. Gardner.

Minutes of the 296th meeting were read and approved.

The Executive Committee reported holding a meeting on October 2nd. At this meeting it was voted to recommend a change in the by-laws that would make available to students of high schools and universities a junior membership, carrying annual dues in the amount of $2.50. It was understood that this class of membership would not have the right to vote. Upon motion by Mr. Ehrhorn, it was voted that the secretary draft a proper amendment and present it at the November meeting.

Mr. Swezey gave an interesting report on the annual outing of the Society, which consisted of a trip to Haleauau Valley and up Mount Kaala, Sept. 14. He stated that 13 participated in the outing and all were enthusiastic about the trip. Messrs. Bryan, Carter and Williams also gave reports of their experiences during the outing.

The following men employed by the U. S. Bureau of Entomology in Honolulu were nominated by the secretary for active membership: O. C. McBryde, C. B. Keck, M. MacPhail, W. H. Mitchell, and R. H. Marlowe. K. Ito, K. Sakimura and John Stanley, employes of the Pineapple Planters' Experiment Station, were nominated for active membership by Dr. Carter.

PAPERS

"Insects of Samoa, a Review."

BY E. H. BRYAN, JR.

NOTES AND EXHIBITIONS

Mealybug enemies from the Philippines.—Mr. Swezey mentioned that a consignment had been received at the Experiment Station, H. S. P. A., from F. C. Hadden, Los Banos, P. I., in which parasitized pink sugar-cane mealybugs had been sent. No parasites had issued since arrival, but from alcoholic material sent, the parasite is an *Anagyrus* species very closely similar to *Anagyrus dactylopii* (How.), introduced a few years ago from Hongkong by Mr. Fullaway, and which has proved so effective as a parasite on *Pseudococcus filamentosus* (Ckll.). In the same consignment were sent various stages of a tiny yellow ladybeetle which feeds on the young mealybugs. There were 40 adults and 118 larvae alive. They readily took to feeding on mealybugs sup-

plied to them, and there are good prospects of this ladybeetle being multiplied for distribution.

Ootetrastichus formosanus Timb.—Mr. Swezey reported having collected this leafhopper egg-parasite from cane at Kawela, Molokai, March 19, 1930. It was not previously recorded from Molokai. It never was colonized on Molokai at the time of its introduction, and has reached that island without special assistance, the same as did *Cyrtorhinus mundulus* (Bredd.), the bug which sucks the eggs of the cane leafhopper.

Anagyrus swezeyi Timb.—Mr. Swezey reported having reared this parasite from *Trionymus insularis* Ehr. on grass at Kanoa, Molokai, September 24, 1930. Not hitherto recorded from that island.

Erebus odora (L.).—Mr. Ehrhorn reported finding one full-grown caterpillar of the "black witch" moth *Erebus odora* on a monkeypod tree, Makiki; also two 1/3-grown caterpillars, all on September 10th. The full-grown one pupated on September 12th and adult moth issued on September 30th. He thought that there is a continuous brood, as he found the same conditions on Alewa Heights. Caterpillars are not abundant, and usually are on the bark of the tree during the day. The color of the bark makes it hard to detect them. Mr. Au exhibited a pupa of this insect which had been found between two grain sacks on Alewa Heights. Discussion indicated that this insect is now on all islands of the group.

Anagrus sp.—Mr. Swezey exhibited a slide mount of specimens of an unknown species of Anagrus, bred from eggs of some unknown insect in leaves of *Ipomoea bona-nox,* collected at the stream from Haleauau Valley, Waianae Mts., Oahu, where the firebreak trail crosses the stream, September 14, 1930. A large number of the parasites had issued from the eggs, the latter being very abundant in about a dozen leaves collected. None of the host insect hatched from the eggs, hence their identity remains unknown.

Zorotypus swezeyi Caudell.—A specimen of this rare insect was exhibited by Mr. Swezey. It was collected by Mr. Van Zwalu-

wenburg in a rotten log in Haleauau Valley, Sept. 14, 1930. A specimen had been collected on the trail up Mount Kaala a few years ago by Mr. Swezey, not far from the same location.

Mr. T. R. Gardner of the U. S. Bureau of Entomology, who has been stationed in Japan for the past seven years, and who is now on his way to the Japanese Beetle Laboratory in New Jersey, gave a very interesting talk on the Japanese beetle *Popillia japonica* and the methods of collecting, rearing, and shipping parasites of this beetle from the Orient to New Jersey.

NOVEMBER 6, 1930

The 298th regular meeting of the Society was held at the usual place, 2:30 p.m., with President Whitney in the chair. Other members present were: Messrs. Au, Bianchi, Bryan, Chapman, Ehrhorn, Hagan, Illingworth, Ito, Keck, McBride, McPhail, Marlowe, Mitchell, Riley, Rosa, Sakimura, Stanley, Swezey, Van Zwaluwenburg, Weinrich and Williams, and Dr. A. C. Baker, T. M. Blackman, Tai Hee Hong and K. H. Lau as visitors. In the absence of the Secretary, Mr. Swezey was appointed Secretary pro tem.

Minutes of previous meeting were read, corrected and approved.

On motion that the Secretary cast the ballot, the following were duly elected to active membership: O. C. McBride, W. H. Mitchell, C. B. Keck, R. H. Marlowe, M. McPhail, John Stanley, K. Sakimura and K. Ito.

The executive committee reported on an amendment to the by-laws to provide for junior members. It was passed, and "Article 3, Members" will now read:

> The Society shall consist of Active, *Junior,* Corresponding and Honorary members. No Corresponding members shall be elected from residents on the Island of Oahu. *Junior Members shall be students at high schools or colleges.*
>
> Election of members shall be by ballot, nomination having been made by a member of the Society at a previous meeting. A majority vote of active members present shall be necessary for election.
>
> The annual dues for Active Members shall be five dollars, *for Junior Members two dollars and fifty cents,* and for Corresponding Members two dollars; Active Members absent from the Territory for

twelve consecutive months or more to be considered as Corresponding Members. Honorary Members shall be exempt from dues.

Any member in arrears for one year may, after due notification, be dropped from the rolls. No member in arrears shall be entitled to a vote or to the Proceedings of the Society for that year.

(Note: The italicized portions are the additions to the Revised By-laws as adopted April 3, 1919.)

PAPERS

"Melasides Nouveaux provenant des collections de la Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu."

BY E. FLEUTIAUX

(Presented by Mr. Van Zwaluwenburg)

NOTES AND EXHIBITIONS

Chloridea obsoleta (Fab.).—Mr. Ehrhorn mentioned the prevalence of the corn ear-worm in green corn at the present time. Others commented on its habits in Hawaii and that it had hardly been known as a corn pest here heretofore. Its more common food plants have been Hibiscus (flowers and buds), tomato, flower heads of marigold, Siegsbeckia, African daisy, etc.

Derolathrus atomus Sharp.—Two specimens of this minute colydiid beetle were exhibited by Mr. Van Zwaluwenburg. They were taken from beneath the bark of a dead Elaeocarpus tree in Haleauau Valley, at the foot of Mount Kaala, Oahu, at an elevation of about 2500 feet, September 14, 1930. The specimens had been determined by Mr. Swezey. Previously this species has been known only from the Koolau range, its only capture since the collection of the original material by Dr. Perkins on "Oahu" being by Mr. Swezey in 1925 on the Pupukea trail, in dead Xylosma.

Aphodius lividus Oliv.—Mr. Swezey reported the occurrence of this beetle swarming at lights at Kaunakakai, Molokai, October 27, 1930. At one electric light in an ice-cream parlor, a few sweeps of the net secured 340 of the beetles. Along with these were counted: 4 *Pleurophorus parvulus* Chev. (another aphodiid), 1 small staphylinid, 11 *Arctocorixa blackburni* (White), and 1 amaranth jassid.

Lagocheirus obsoletus Thoms.—A specimen of this longicorn beetle was exhibited by Mr. Swezey, who had caught it at light at Mapulehu, Molokai, September 24, 1930. It had apparently not been recorded on that island previously.

Melittobia hawaiiensis Perkins.—Mr. Swezey reported having found this parasite very prevalent in nests of mud-dauber wasps on buildings of the Mapulehu Dairy, Molokai, September 9, 1930. They were breeding on the larvae of the mud-dauber, and also on larvae of *Pachodynerus nasidens* (Latr.) in old mud-dauber cells. From one Pachodynerus larva 335 adults matured.

Cycloptiloides americanus (Sauss.).—A specimen of this small cricket was exhibited by Mr. Swezey, collected under stone at Kanoa, Molokai, October 27, 1930. It had not previously been recorded from that island.

Bruchus amicus Horn.—Mr. Swezey reported the collecting of specimens of this bettle from tufts of Eragrostis grass (where they were hiding) in Iao Valley, Maui, September 11, 1930. Apparently the first record of its occurrence on Maui.

Nesamiptis plagiota Meyrick.—A specimen of this moth was exhibited by Mr. Swezey, who had reared it from a caterpillar collected on Eragrostis grass, Iao Valley, September 11, 1930. It is the first time that the moth has been reared. The caterpillar was similar to that of *Nesamiptis obsoleta* (Butl.), which commonly feeds on grasses in the native forests throughout the islands.

Litomastix floridana (Ashm.)—A dead Plusia caterpillar containing pupae of this parasite was exhibited by Mr. Swezey. The caterpillar was found feeding on *Datura arborea,* October 30, 1930, at the Experiment Station, H. S. P. A. Another Plusia caterpillar had been collected similarly October 20, from which the parasites when matured were counted, there being 901 from the single host caterpillar. This parasite is continuing a quite effective control of Plusia in Honolulu since its discovery here in February, 1929.

Systole geniculata Först.—Mr. Swezey reported rearing four of this seed-chalcid from fennel seeds collected by Mr. Van Zwaluwenburg in Kohala, Hawaii, October 3, 1930. Ten *Tetrastichus*

sp., the parasite of the above, issued from the same batch of seeds. This is the first record of these insects occurring on the Island of Hawaii. They were first discovered at Ewa Plantation in fennel seeds, July 16, 1930.

Rhabdocnemis obscura (Boisd.)—Mr. Swezey reported that in company with Mr. Chock, two Pritchardia palms were examined on Pacific Heights, which were badly infested with the sugar cane borer. The borer grubs were chiefly in the bases of the leaf stalks where they had done so much damage that the stalks were in a very rotten condition, causing the leaves to drop off earlier than normal, according to the householder. About half of the grubs found and examined contained maggots of the tachinid parasite, *Ceromasia sphenophori* Vill. Most of the borer cocoons contained the parasite puparia or else old empty puparia. This was the worst infestation of a palm by this beetle that Mr. Swezey had ever seen. The trees seemed to be thriving, however, the trunks were not much injured, and the most of the leaves were in fine condition. It was a remarkable occurrence of the tachinid parasite working in such unusual circumstances so far from any cane fields, where it normally lives and attacks the borers in cane.

Reticulitermes hesperus Banks.—Mr. Whitney reported the finding of this termite infesting redwood burls imported from California. It was the second time that this termite had been intercepted at the port of Honolulu. He also reported the intercepting of *Kalotermes* sp. from Mexico, in quarantine inspection work.

Mounted butterfly eggs.—Mr. Blackman exhibited mounts of butterfly eggs. The eggs had been blown and permanently mounted on glass microscope slides.

DECEMBER 4, 1930

The 299th regular meeting of the Society was held at the usual place at 2:30 p.m., President Whitney presiding. Other members present were: Messrs. Bianchi, Bryan, Chapman, Carter, Hagan, Au, Illingworth, Ito, Keck, McBride, Mitchell, Stanley, Swezey,

Van Zwaluwenburg, and Wilder; and the following visitors: T. M. Blackman and Amy Suehiro.

In the absence of the secretary, Mr. Ehrhorn was appointed secretary pro tem.

Minutes of the previous meeting were read and approved.

Mr. Joseph T. Watt was elected to active membership.

Officers elected for 1931 were as follows:

President, A. C. Mason.

Vice-President, Dr. R. N. Chapman.

Secretary-Treasurer, Dr. F. X. Williams.

Other members of Executive Committee, D. T. Fullaway, E. M. Ehrhorn.

Mr. Swezey presented the matter of a request from Mr. J. A. Hyslop that the Society furnish a list of common names of the common insects in Hawaii to be incorporated with a list being assembled by the committee on nomenclature of the American Association of Economic Entomologists. On motion, the Chair appointed a committee of Messrs. Swezey, Bryan and Ehrhorn to get up such a list.

PAPERS

"Pineapple Cannery Waste and its Insect Problems."

BY DR. J. F. ILLINGWORTH.

"On some new and little-known Fulgoroidea from South America."

BY F. MUIR.

(Presented by O. H. Swezey)

"Descriptions of New Hawaiian Coleoptera."

BY DR. R. C. L. PERKINS

(Presented by title by O. H. Swezey)

PRESIDENTIAL ADDRESS

"Origin and Development of Plant Quarantine"

BY L. A. WHITNEY.

NOTES AND EXHIBITIONS

Pyroderces rileyi (Walsm.)—Dr. Hagan reported that among pineapple seeds used by the Associated Hawaiian Pineapple Can-

ners' department of genetics, were found a number of lepidopterous larvae which were seriously damaging the seeds. The adults, after being reared, were determined by Mr. Swezey as *Pyroderces rileyi*. As they were destroying seeds stored for breeding purposes, they could be considered of considerable economic importance.

Rhyncogonus simplex Perkins.—Mr. Swezey exhibited a specimen of this native weevil, captured by him on *Malvastrum tricuspidatum* at Koko Head, Oahu, November 27, 1930. Eighteen specimens were captured at that time, in the same spot where Mr. Hadden had collected three specimens in January, 1928. Some of the beetles were kept alive to try breeding them.

Volucella pusilla Macq.—Specimens of this syrphid fly were exhibited by Mr. Swezey. The first specimen was captured by Mr. Rosa in Oahu Sugar Co. Plantation, October 30, 1930. Seven more were captured by Messrs. Swezey and Williams on plants of *Alternanthera versicolor* at Red Hill across the road from the Hawaiian Pineapple Company's fruit stand, November 25, 1930.

Chlorion (*Isodontia*) *harrisi* Fernald.—Mr. Swezey read a note by Dr. Williams reporting on the discovery by Mr. Swezey and himself, on November 25, 1930, alongside field 4B, Waianae Plantation, Waianae, Oahu, of a large sphecoid wasp closely related to *Chlorion* (*Isodontia*) *harrisi* Fernald, if not that species. Altogether two males and one female were taken in this lowland area. Several other specimens were seen at Euphorbia flowers. *Isodontia harrisi* is common in the United States, east of the Rocky Mountains, and has also been reported from Mexico. It preys upon tree crickets (*Oecanthus* sp.), but another species may also capture young grasshoppers. In the tropics less is known of their habits. They are not burrowing wasps, but use some preexisting cavity for a nest, and fashion cells of dried grass or other plant fibre, as the pappus of seeds, tomentum of plants, etc.

Sodium Fluoride as an ant repellant.—Mr. Ehrhorn related his experience with the ants *Pheidole megacephala* and *Plagiolepis mactavishi* swarming into houses and entering electric conduits and destroying the insulation, this especially being true of *P. megacephala*. Sodium fluoride had been used successfully as a

repellant, and carbon bisulphide had been used in killing nests of the latter ant in sandy soil. The swarming mentioned usually occurs when there are abundant rains, which seem to drive the ants into houses.

New Myriapod Records.—Mr. Van Zwaluwenburg reported that among cane soil fauna submitted to Dr. Folsom from the Experiment Station, H. S. P. A., were numerous myriapods which he referred to Prof. Stephen R. Williams of Miami University, Oxford, Ohio. The latter has made the following identifications: *Scolopendrella neotropica; Scolopendrella simplex; Polyxenus* (probably) *fasciculatus* Say (described from southern United States). The pauropod common in cane soils, he writes, "has the size and appearance of *Pauropus huxleyi* Lubbock." This species is recorded from Europe, both seaboards of the United States, and Lower California.

New Collembola Records.—Mr. Van Zwaluwenburg also reported that Dr. Folsom of Tallulah, La., reports upon Hawaiian Collembola submitted to him as follows:

From cane soils:

Isotomodes sp.
Onychiurus fimetarius (L.) Lubb.
Folsomia fimetaria (L.) Lubb.
Isotoma palustris Mull. var. *balteata* Reut.

From pineapple soil:

Lepidocyrtus cyaneus Tull.

Soil Arachnid new to Hawaii.—Mr. Van Zwaluwenburg further reported Dr. C. R. Crosby as writing concerning material collected in cane-field soils: "Among these minute Arachnids I found some very interesting things. One is a blind spider and the other is a specimen of the order Microthelyphonida. There are only a few species of this order in the world, but they are widely distributed."

New Acalyptrate Diptera from the Pacific and Oriental Regions.

BY J. M. ALDRICH

U. S. National Museum

(Presented by Mr. Bryan at the meeting of February 7, 1929)

Several of the new species here included have been awaiting identification for some time, having been collected by Mr. Bryan in 1923. The others have been received more recently from several collectors. The type material is in the U. S. National Museum and the Bernice Pauahi Bishop Museum, as indicated.

Atissa antennalis, new species.

Female.—Length .94 mm. Uniform dark brown in color, face and cheeks with slightly more gray pruinosity. Wings blackish, the costal segment before the tip of the second vein equal to the one beyond it; third vein ending in apex; hind crossvein with slightly deeper infuscation. Antennae dark brown, the short-plumose arista arising from the base of the third joint, outer side of the joint at apex with about five distinct white hairs of considerable length. Tarsi yellowish brown.

Described from two specimens collected on Necker Island, June 18, 1923, by E. H. Bryan, Jr., "ex pools salt water."

Type.—Female, Cat. No. 41630, U. S. N. M. Paratype deposited in Bishop Museum, Honolulu, Hawaii.

The species resembles *Atissa pygmaea* Haliday in all points of structure, including the sparseness of the acrostichal hairs, which are in four scattering rows between the dorsocentrals. The color agrees very well with *A. limosina* Becker, collected on the coast of Norway, but that species seems to have the wings less infuscated and the crossvein more distinctly so; and I can find no reference in the description to the peculiar pale hairs of the third antennal joint which seem to be a striking feature of the present species.

Tethina insularis, new species.

Male.—Length 2.2 mm. Body rather elongate; thorax brown; head, legs and scutellum yellow. Abdomen black. Front rather dark yellow, the orbitals lighter; orbitals 3, the first and third reclinate and divergent, second divergent. Three pairs of inner frontal bristles converging toward the antennae; ocellars distinct, divergent; two pairs of verticals; post-verticals

convergent. Front narrow to the antennae where it is a little over one and a half times as wide as at the posterior ocelli. Parafacial narrow; cheek only one-sixth the eye height; eye nearly round; a row of bristles at edge of mouth, ending in a distinct vibrissa; proboscis short and rather stout, with conspicuous labella folded back and a distinct, thin outer margin forming a deep groove into which the middle part of the proboscis folds; face rather concave; third antennal joint round, infuscated on apical half, the arista slightly pubescent. Mesonotum with four pairs of dorsocentrals and an equally large pair of prescutellars; acrostichal hairs between the dorsocentrals in six distinct rows. Scutellum flat, rather triangular, yellow toward apex with two pairs of bristles, otherwise bare. Humeri rather yellow; pleurae brown; mesopleura hairy with one ascending bristle near upper edge and one large and two small along hind margin; sternopleural with one bristle; knob of halteres brown. Abdomen black or dark brown with a row of bristles along the hind margin of each segment. Wing subhyaline; auxiliary vein evanescent except at base; first vein short; second diverging from third and ending a little before the tip of wing; last section of fourth vein about one and two-thirds times preceding; last section of fifth vein hardly more than half the preceding; discal cell separated from the second basal; basal cells minute; small crossvein at two-fifths of the discal cell.

Described from 13 specimens, apparently all males; 11 are from Wake Island, June 30, 1923, collected by E. H. Bryan, Jr., and two collected at Pearl and Hermes Reef, Hawaii, by D. T. Fullaway, April 27, 1923. The last two differ only in having the last two tarsal joints black in all the feet, which is only slightly indicated in the other series.

Type.—Male, Cat. No. 41629, U. S. N. M., from Wake Island.

Paratypes from both localities returned to Bishop Museum.

I place this species in the genus *Tethina* because it seems to agree very well with *T. albula* Loew, the principal difference being that the eye is larger and the cheek considerably narrower; the structure of the front agrees very well. I do not have access to the genotype of *Tethina* (*illota* Haliday).

Bryania, new genus.

Like Asteia (the genotype, *amoena* Meigen) in venation, and in having one pair of erect scutellar bristles arising considerably before apex; two pairs of erect dorsocentrals; inner and outer verticals, the former somewhat convergent; post-verticals absent; one reclinate pair of frontals, and distinct vibrissae. Differs in having the head elongated, the front prominent and almost horizontal, much overhanging the face; the eye elongated, and the cheek quite long and one-third as high as the eye.

Genotype.—Bryania bipunctata new species.

Bryania bipunctata, new species.

Female.—Length 1.6 mm. Front yellow, opaque; ocellar triangle black but densely opaque with gray pollen; ocellars minute; a brown stripe from eye to base of antennae; antennae brown, third joint whitish on lower third, arista missing; face concave below antennae, light gray in color, with a pair of small black spots on middle; cheeks and palpi almost white. Thorax elongate, densely gray pollinose, yellow in ground color, with two pairs of black stripes so heavily cinereous that they are little visible; scutellum light yellow; pleurae yellow with dull black stripe on lower two-thirds of sternopleura continuing above hind coxae, and another above it beginning on pteropleura; several pale bristly hairs on the pale upper edge of sternopleura. Abdomen with alternating bands of black and yellow, in poor condition. Legs yellow. Wings hyaline, with a black dot on the closely approximated tips of the first and second veins.

Described from two females, collected on Nihoa Island, Hawaii, June 13, 1923, by E. H. Bryan, Jr., after whom the genus is named, in honor of his services in making known the insect fauna of the Pacific Islands.

Paratype.—Female, Cat. No. 41628, U. S. N. M. The type is returned to the Bishop Museum, Honolulu.

The two species of Asteia from Hawaii named by Grimshaw in Fauna Hawaiiensis (Diptera, p. 73) are quite distinct from the present species and appear to be true Asteias.

Milichiella circularis, new species.

Male.—Rather dull black in color, the abdomen broadly expanded, circular and almost wholly silvery. Head as in *lacteipennis* Loew, quite narrow just below the antennae, the vibrissae far above the mouth; a distinct excision in the back of the eye about the middle. Antennae small, black; arista slender, bare. Palpi black. Thorax uniformly black, a little shining, with rather dense suberect hairs. Dorsocentral 2, the anterior smaller; mesopleura bare, shining; sternopleura with 2 large and 2 or 3 smaller bristles; calypters white, hind edge with a slight brownish tinge which is sometimes rather conspicuous; the fringe of hairs, however, is pale. Halteres black, including stem. Dorsum of the abdomen with the following parts silvery: sides of second segment, all of third except a posterior dark band on the middle half which takes in a little less than half the length of the segment; fourth segment wholly, except a very narrow dark border along the middle half, not sharply limited; fifth segment, except the apical third in the middle portion. The silvery part of the abdomen is almost entirely destitute of hairs, which are rather coarse and black on the black portions. The legs, including tarsi, wholly black. Wings subhyaline, not at all milky; costa

with deep incision at first vein; fourth vein converging toward third, which ends just behind apex. Last section of fourth vein about one-fourth longer than the preceding. Last section of fifth vein hardly longer than hind cross-vein, less than one-fourth the preceding section of fifth.

Length, 2.8—3 mm.

Described from 6 males collected in pineapple fields in Hawaii by J. F. Illingworth, and 8 males collected "near compost," Honolulu, by O. H. Swezey. The type (from the first lot) and 4 paratypes are returned to the Bishop Museum, Honolulu.

Paratype.—Male, Cat. No. 41489, U. S. N. M.

Comes nearest to *cingulata* from Bolivia in Becker's key (Ann. Mus. Nat. Hung. v, 1907, 532), but differs in having the fourth vein distinctly converging to third, its last section less than twice the preceding, etc.

Milichiella bakeri, new species.

Male.—Head and thorax black, but little shining. Abdomen considerably expanded, wholly silvery above except the first segment and the lateral angles of the second; head as in *lacteipennis* Loew and *circularis* new species. Antennae and palpi black, the latter quite broad; proboscis small, but the labella folded back. A distinct emargination in the back of the eye above the middle; thorax with rather dense, suberect hairs; mesopleura bare; sternopleura with two bristles; halteres wholly black; calypters black with brown hair. Abdomen a little wider than thorax, but the silvery portion is considerably turned down at the sides, indicating that it might be expanded almost into a semicircular form. At the edge of the silvery portion ventrally is a conspicuous dense row of bristles running along on the segments. Second to the fifth segments with some coarse black hairs on the hind part. Legs black, tarsi reddish yellow. Middle femur with dense bristles on front side on the apical half. Wings almost hyaline, slightly brownish on costal half. Venation as in *circularis.*

Length, 2.8 mm.

Described from 3 males, collected on Mt. Makiling, Luzon, P. I., by Prof. C. F. Baker.

Type.—Male, Cat. No. 41490, U. S. N. M.

Closely resembles *argyropasta* Perris of Europe, which I have not seen: judging by Mik's detailed description (as *tiefi,* a synonym), the distinctly yellow tarsi of *bakeri* are distinctive. From *spinthera* Hendel (Suppl. Ent., 1913, 107), a Formosan species, *bakeri* differs in the dark calypters.

Milichiella smithi, new species.

Male.—Black, including halteres, antennae, and palpi; the tarsi however reddish yellow. Head about as in *lacteipennis*, back of eye notched, the front narrow at the antennae and the vibrissae extending up to the antennal depression. Dorsum of thorax black, subshining in front, gradually overlaid with thin silvery pollen which is quite striking on the posterior half; the scattered hairs and bristles arise from dark dots in this pollen. Scutellum black, subshining, not silvery. Dorsocentral one pair; calypters brown with blackish fringe.

Abdomen broad and flat, uniformly silvery above except a black depressed triangle under the scutellum; the second and fifth segments elongated; second to fourth with a thin row of small dark bristles near the hind edge, not arising from dots; sides of segments two to five silvery on the portion which is bent vertically downward and which perhaps in life can be raised to a level with the remainder of the dorsum so as to give the abdomen a circular outline with uninterrupted silvery sheen.

Wings hyaline, not milky; third and fourth veins a little convergent at tip; last segment of fourth vein more than twice the preceding; hind crossvein at right angles to axis of wing, slightly longer than last segment of fifth vein.

Length, 2.4 mm.

Described from 24 males collected at Bangkok, Siam, April 23 and October 27, 1928, by Dr. Hugh M. Smith, after whom the species is named.

Type.—Male, Cat. No. 41719, U. S. N. M.

In Becker's key to the genus this species runs only as far as the fourth couplet, differing from all the others in having the dorsum of the thorax distinctly silvery.

New Diptera Names in Hawaii.

BY E. H. BRYAN, JR.

(Presented at the meeting of July 11, 1929)

Keeping up with entomological synonymy may to some workers be a pleasing and fascinating sport. To most of us it is a delusive drudgery. Each time a taxonomic publication dealing with the insects of the Pacific region appears, I look through it with a sinking feeling, to see how many familiar and long-established names have been pushed into the discard, and what has been perpetrated in their stead.

The most recent publication thus perused was "Diptera Brachycera and Athericera of the Fiji Islands," by the late Mario Bezzi, published by the British Museum, 1928. In this little book are listed 239 species of flies found in Fiji. Of these 27 also occur in Hawaii. But of the 27 the names of 10 have been changed, or at least are different from those by which the species are locally known.

The species common to both Hawaii and Fiji are as follows:

Dolichopodidae

Medetera femoralis Becker.

Psilopus pallidicorne (Grimshaw) is noted as being in the genus Chrysosoma Guer., a Fiji species *C. greenwoodi,* being very close to it.

Chrysosoma patellifer (Thomson), described from Guam, is found in Fiji, but differs from the species known as *Psilopus* or *Gnamptopsilopus patellifer* Thomson recorded by Grimshaw and others from Hawaii. Our species is something else.

Syrphidae

Ischiodon scutellaris (Fab.) is the latest name for the species recorded from Hawaii by Howard, Grimshaw and others as *Xanthogramma grandicornis* (Macquart) and more recently called *Simosyrphus grandicornis* (Macquart) by Curran.

Volucella obesa Fabr. is common in both groups. Although Bezzi had no specimens from Fiji, I collected it there.

Syritta oceanica Macquart.

PHORIDAE

Bezzi records *Aphiochaeta xanthina* Speiser as being bred from diseased pineapple suckers from Hawaii. 19-II-1922 (Simmonds). Our species here in Hawaii has been known as *Aphiochaeta scalaris* (Loew).

ORTALIDAE

Euxesta quadrivittata Macquart—(= *Euxesta annonae* Loew (nec Fabr.) as recorded in Hawaii by Grimshaw and others.)

Acrosticta pallipes Grimshaw, originally described from Hawaii, but subsequently recorded from South America (Bolivia and Peru) by Handel, in 1909.

Scholastes bimaculatus Handel, whose maggots breed in fallen coconuts.

PIOPHILIDAE

Piophila casei (Linn.), the cheese skipper.

CHLOROPIDAE

Rhodesiella nitidifrons Becker is perhaps the same as *Rhodesiella tarsalis* Adams, found in Hawaii.

DROSOPHILIDAE

Drosophila ampelophila Loew, which we call *D. melanogaster* Meigen.

BORBORIDAE

Leptocera ferruginata Stenhammar. Two other species recorded from Fiji may also be among the undetermined tiny Borborids known in Hawaii.

MILICHIIDAE

Milichiella lacteipennis Loew.

Desmometopa m-nigrum Zetterstedt. Dr. Aldrich has recently decided that our species in Hawaii is *D. tarsalis* Loew. These may or may not be the same.

AGROMYZIDAE

Ophiomyia lantanae (Froggatt) is a new name for the lantana seed fly, introduced from Mexico, and locally known as *Agromyza lantanae* Froggatt.

Liriomyza pusilla (Meigen) is a new name for the serpentine leaf-miner, common in North America, Hawaii, and other localities, and formerly in the genus Agromyza.

ANTHOMYIIDAE

Atherigona excisa Thomson var. *trilineata* Stein (=*A. pulvinata* Grimshaw).

Ophyra nigra (Wied.) Malloch.

MUSCIDAE

Synthesiomyia nudiseta v. d. Wulp.

Musca domestica Linn. Bezzi records it as var. *vicina,* but Malloch (Insects of Samoa, Pt. VI, fasc. 3, p. 174, 1929) states that he does not accept *M. vicina* as distinct from *M. domestica,* saying that the only difference between the two forms lies in the comparative widths of the frons in the two sexes.

Stomoxys calcitrans Linn.

GASTROPHILIDAE

Gastrophilus nasalis Linn.

CALLIPHORIDAE

Chrysomyia rufifacies Macquart (=*Ch. albiceps* Wiedemann).
Chrysomyia megacephala Fabr.
Rhinia testacea Rob.-Desv.

SARCOPHAGIDAE

Sarcophaga dux Thomson.
Sarcophaga fuscicauda Böttcher.

TACHINIDAE

Microceromasia sphenophori (Villen.) (=*Ceromasia sphenophori* Villen.) the valuable little tachinid parasite of the sugar cane beetle borer, introduced from New Guinea.

Dr. Bezzi prefaces his book with some very interesting remarks on the character and origin of the Diptera fauna of Fiji. He states that 60.5 per cent, or 144 species, of flies are endemic; of which he describes 95 per cent as new; 6.3 per cent are listed as species from other Pacific islands; 6.7 per cent are from the east coast of Australia, Tasmania, New Zealand and New Guinea; 5.4 per cent are Austro-Malayan species; about the same number are oriental, chiefly from Java, Formosa and the Philippines; the same number are Ethiopian-Austro-Malayan; and 8.4 per cent are cosmopolitan, or found generally throughout the tropics. Thus, four-fifths are endemic, Pacific or Austro-Malayan, and the remaining one-fifth are of wide distribution, for the most part associated with man.

Two New Species of Tigava from South America, (Hemiptera-Tingitidae)

BY CARL J. DRAKE, AMES, IOWA, U. S. A.

(Presented by Mr. Van Zwaluwenburg at the meeting December 12, 1929)

Tigava semota, n. sp.

Very elongate, faintly narrowed anteriorly. Head brownish black, with three spines; posterior pair very long, testaceous, each strongly curved anteriorly, its tip touching head near insertion of antenna; median spine much shorter, stouter, blunt, testaceous, directed slightly downward. Antennae very long, slender, indistinctly pilose; segment I very long, brown, ten times as long as two; II extremely short, fuscous; III three times as long as one, curved; IV considerably swollen, black, the basal portion slender and pale brown. Bucculae testaceous, closed in front. Rostral laminae testaceous, the rostrum extending between intermediate coxae. Body beneath black. Orifice distinct, black.

Pronotum moderately swollen, coarsely pitted, narrowed anteriorly, ferrugineous, the portions in front of lateral carinae and immediately behind swollen area blackish; the apex or triangular projection, hood, paranota, collum and carinae testaceous. Paranota narrow, very slightly produced in front. Carinae prominent, indistinctly areolate; median carina more strongly elevated; lateral carinae strongly diverging anteriorly and terminating at the calli. Elytra ferrugineous-testaceous, each with a large spot just behind the apex of pronotum and a long broad stripe in sutural area, which terminates in a transverse fascia a little in front of apex, dark fuscous; costal area moderately broad, composed of one row of large areolae, the lateral margin faintly serrate; subcostal area biseriate, not broader than costal area; discoidal area not extending to middle of elytra, narrowed at both base and apex. Wings a little longer than abdomen. Genital segment of male large and broad, the claspers quite large and strongly curved. Legs long, slender, testaceous.

Length, 4.37 mm.; width, 1.04 mm.

Holotype, male, Chapoda, Brazil, Drake collection. The broad costal area separates this insect at once from the species of Tigava described by Stål and Champion.

Tigava bondari, n. sp.

Superficially and structurally very similar to *T. mollicula* Drake. Rostrum extending a little beyond the anterior margin or almost to the middle of the mesosternum. Antennae as in *T. mollicula;* head quite different, not so strongly swollen above, and the spines much stouter and longer; median spine very long and stout, very large at base, gradually narrowed to apex, almost reaching the apex of the first antennal segment; pos-

terior pair extending a little beyond the base of the antennae, their tips curved slightly outward; anterior pair much shorter, curved inward, reaching almost to the middle of the first antennal segment. Other characters, color and markings very similar to *T. mollicula.* Elytra with color and structural characters very similar to *T. mollicula.*

Length, 3.23 mm.; width, .78 mm.

Six specimens, Bahia, Brazil, collected by Dr. Gregorio Bondar. *Holotype,* male, and *allotype,* female, in Drake collection. The characters of the head and longer rostrum separate this species from its closest ally, *T. mollicula* Drake. In the latter (*Holotype,* female) the rostrum extends to the end of the mesosternum; the head is strongly swollen above; the median and anterior spines are much shorter, slender, and reach almost to the middle of the first antennal segment; posterior spines long, stout, decumbent, directed anteriorly, straight and extending to the base of the antennae. In one of the paratypes of *T. bondari,* the median spine is quite short, probably the result of injury during its nymphal stage.

Longhorned Grasshopper, *Conocephalus saltator* (Saussure), as a Pest of Pineapples in Hawaii.

(Presented at the meeting of February 7, 1929)

BY J. F. ILLINGWORTH

This grasshopper has long been recognized as a valuable predacious species, feeding upon many kinds of minute insects. In pineapple fields I have recorded it as a real check upon the mealybug *Pseudococcus brevipes* (Cockerell). In fields, however, that adjoin grass areas, these hoppers congregate in such numbers as to be a real menace. Under such conditions there is apparently not enough insect food for them and they return to their ancestral diet, eating the plants.

During dry, hot weather they cause some damage to the leaves, gnawing them at their tips. This gives the plants a ragged appearance, but usually results in no serious injury. During investigation of the so-called Kauai disease, I frequently observed these grasshoppers feeding upon the softer parts of the pineapple flowers, and in some cases even gnawing the harder bracts covering the fruitlets. I was much surprised, however, to find that the females were laying their eggs in the fruits. Swezey has recorded these insects laying their eggs in the sheath of sugar cane leaves, but no injury resulted to the plant.

At the time of flowering, of course, the pineapple is small, hardly larger than a goose egg. The female grasshoppers sitting about on the fruit, find it very convenient to shove the ovipositor into the heart of the tender flowers, the number of eggs deposited in each case being limited, usually from one to three. Wherever the ovipositor ruptures the floor of the calyx cavity, as it occasionally does, fungi gain an entrance and that part of the fruit begins to break down. In some instances, the dry, localized rot, so characteristic of Kauai disease, may result from such infection.

An examination of the tops on the fruits, disclosed many of the grasshopper eggs, thrust here and there, between the short leaves. In a few instances the ovipositor had gone so deeply as

to puncture the stem, leaving the egg deeply imbedded in the solid tissue.

Insects in the Waiahole Ditch

BY J. F. ILLINGWORTH

(Presented at the meeting of May 2, 1929)

I was surprised, April 30, 1929, to find insects literally by the tubful, that had fallen into this long open canal. At the point where the ditch crosses the Kamehameha Highway, at Waipio, there is a back eddy where the insects pile up. The collection floating on the surface of the water was a writhing mass of millions of insects. Those that resisted drowning worked their way to the top, and while resting on the bodies of those submerged, some were able to take wing. A field luna was circumventing this escape of the pests by dipping up this floating collection and placing it on a fire.

Examination showed that the mass was composed largely of the first two species of the following list:

1. *Adoretus sinicus* Burm. was present in countless numbers. These beetles do not easily succumb to drowning, so many eventually escape by taking wing.

2. *Charadromyia torrenticola* Terry. This chironomid fly is a natural inhabitant of the ditch. The floating mass was composed largely of their pupae and cast larval skins. The adults were emerging in numbers. Terry described this species from Hawaii and Maui in the Proceedings of the Hawaiian Entomological Society Vol. 2, p. 291, July, 1913. I have been unable to find any published reference to its occurrence on Oahu. Evidently it is present in the streams of the upper reaches of the Waiahole Ditch, and thus is carried down to the lower levels.

3. *Scolia manilae* Ashm. is unfortunately a frequent victim of the open waterway. Possibly the smell of the Adoretus beetles is an attraction to them, since they parasitize the grubs of this pest. I say this because I found these wasps congregating on the pile where the beetles had been dumped out of the ditch.

4. *Labidura riparia* (Pallas). Earwig.

5. *Periplaneta australasiae* (Fab.). Australian Roach.

6. *Diploptera dytiscoides* (Serv.). Cypress Roach.

7. *Carpophilus humeralis* (Fab.). Pineapple beetle.

8. *Aphodius lividus* Oliv. Dung beetle.
9. *Araecerus fasciculatus* (De G.). Fruit beetle.
10. *Monocrepidius exsul* Sharp. Click beetle.
11. *Gonocephalum seriatum* (Boisd.) Ground beetle.

Insects belonging to the species numbered (4) to (11) were represented by comparatively few specimens.

The piles of dead insects thrown out of the ditch attracted predators in great numbers. I have arranged these in the order of their abundance.

1. *Dactylosternum abdominale* (Fab.)
2. *Philonthus longicornis* Steph.
3. *Oxytelus* sp.
4. *Saprinus lugens* Er.
5. *Colobicus parilis* Pasc.

Tarsonemus ananas Tryon, **A Mite That Is Becoming a Serious Pest of Pineapples in Hawaii**

BY J. F. ILLINGWORTH

(Presented at the meeting of February 7, 1929)

While investigating the so-called Kauai disease of pineapples, early in the 1929 season, I discovered that many of the calyx cavities contained several sorts of mites. One species of these, which appeared to be able to cause considerable damage to the fruit, I determined as above. This mite was first discovered, under similar conditions in pineapples, in Queensland, in 1898, by Mr. Henry Tryon. His complete report on the subject was published in the Queensland Agricultural Journal, v. III, pp. 458-467, 1898.

Mr. Tryon's description of the injury to pineapple fruits by this mite appears to exactly fit what is known as Kauai disease in Hawaii. This name came about from the fact that the trouble was first discovered here on the island of Kauai. Briefly, this disease is a dry rot affecting one or more eyes of the fruit—fruitlets, Tryon calls them. As the fruit increases in size, there is more or less distortion, because of the dry, dead area, and this usually cracks open. The dry cavities are coated with the grey-green spores of the fungus Penicillium.

Inside the calyx cavities, on diseased fruits, there is considerable evidence of the work of the mites. Brown abrasions are seen

on the inner surface of the calyx lobes, and ulcers of varying sizes are present in the flower tubules. These tubules are three in number, and extend deeply into the white pulp of the placental area of the ovary.

The Tarsonemus mites do not appear to congregate in any considerable numbers anywhere on the pineapple plant. Yet, I have found them distributed over almost every part of it. When the fruit buds first form, the mites gather between the leaf scales of the tiny tops. Later, as the flowers open, they migrate into the calyx cavities. This is probably the only place that they do any serious harm. Mites belonging to this genus are recorded as pests of strawberries, oats, wheat, grasses, rice, ferns, tea, rubber, peppers, potatoes, sugar cane, etc.

During January, 1929, I experimented with various emulsions, nicotine sulphate, sulfur-tobacco dust, etc., applied to the young tops, before the flowers opened. Several months later, when the fruits were nearly ready to pick, I took careful counts of mite-injured fruit, but could see no appreciable result. The main difficulty is that the mites are so well covered by the closely imbricated parts of the plant that surface applications do not reach them. The best time to apply remedies is undoubtedly when the fruit buds are very young. The mites congregated between the scales of the tiny tops are more exposed than at any other period. It is important, however, to apply treatments before the flowers open.

The Black Widow Spider

BY J. F. ILLINGWORTH

(Presented at the meeting of July 11, 1929)

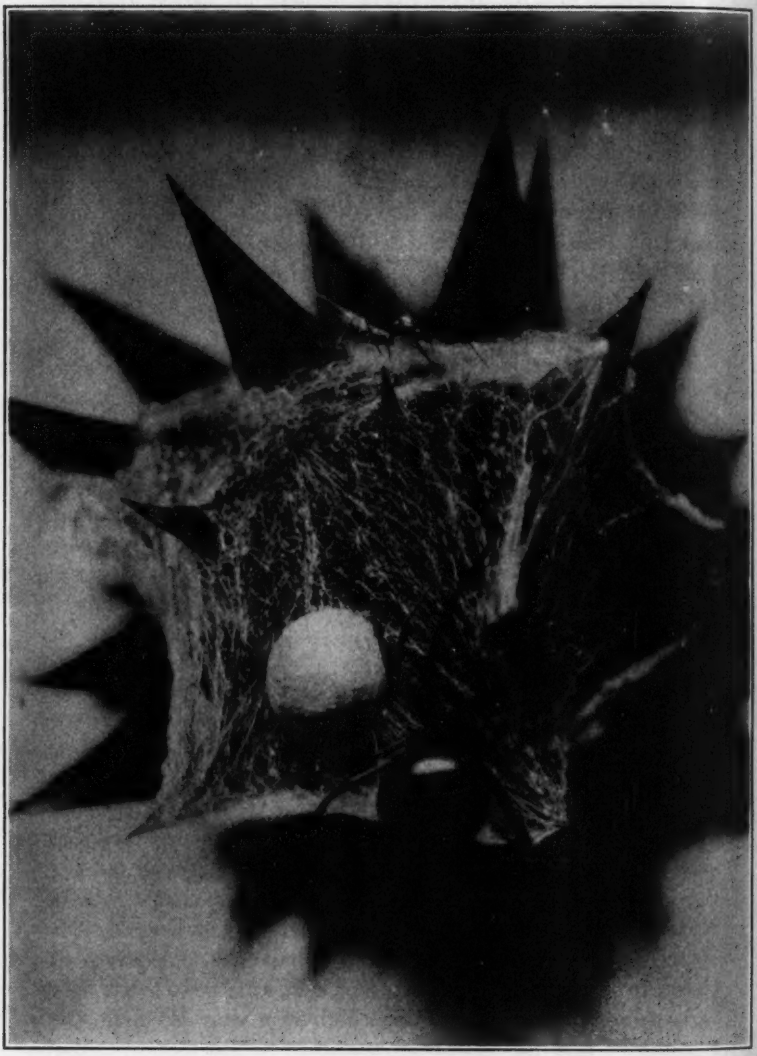
This poisonous species, *Latrodectes mactans* (Fabr.), commonly known as the black widow or hourglass spider, has spread with remarkable rapidity in the islands. It appears to particularly favor pineapple-growing areas, especially where mulching paper is used.

The first record of this pest in Hawaii is by Hadden, who found it at Koko Head November 25, 1925. He later reported finding it at Waikiki. April 16, 1926, I collected specimens in an old pineapple field at Waianae. Soon after, it was discovered by various individuals in widely separated localities, Pearl Harbor, Lanikai, etc.

During my survey of the island of Lanai in August, 1927, the black widow spiders were found to be widely distributed in that new pineapple-growing section. Subsequently, I have observed their remarkable spread on Oahu, extending from Moanalua, Waipio and Wahiawa, to Helemano, and even to the furthest limits of Kemoo. Just recently (September 6, 1929) I found them exceedingly abundant in Kunia fields. This is one of our driest sections, located on the Waianae side of the valley. At the same time, they have been gaining a foothold on the other islands. May 28, 1929, Mr. Jacobson, manager of the California Packing Corporation on Molokai, told me that he had noticed these black spiders in considerable numbers at Kualapuu, a portion of the Cooke's Ranch. In this instance the nests were in fruiting pineapple plants.

This pest undoubtedly came to us from the Coast. Its native home is in the Americas. Records show it ranges all the way from New Hampshire to Patagonia. It is particularly abundant in Mexico. Near relatives of our species occur in the Eastern Hemisphere, especially along the borders of the Mediterranean. The notorious "Katipo" of New Zealand is very similar, as is also the one in North Queensland. The only difference, that I noted, is that some of the red marking is also conspicuous on the back of the abdomen.

The irregular tangled web of the black widow is quite conspicuous, as it surrounds a pineapple plant. Once seen, it cannot be mistaken for any other species common in our fields. The female may be located either in the center of the plant, between the youngest leaves, or down under the mulching paper. She frequently has a retreat ready in both places. It is an easy matter to collect her, for when disturbed she pulls in her legs and becomes quiescent. When full-grown, the female usually has one or more egg-sacs, or cocoons in her home. In one of these, that I opened, I found five hundred and twenty-one eggs. On hatching, the young spiders climb rapidly to the tips of the pineapple leaves. I observed that even a light breeze is able to waft them away, their webs acting as parachutes to transport them long distances. As a matter of fact, this is their main method of distribution. Comstock states that they may be carried hundreds of miles by the wind, as evidenced by their falling upon ships at sea.



Black Widow Spider and Egg Cocoon.

We find, that under favorable conditions, the young grow rapidly, maturing in from one to two months. When confined in a jar, however, they seem to prefer to feed upon their own mates, even when supplied with an abundance of small insects. Under such conditions, the final result was that only two spiders came to maturity—a male and a female. These had destroyed all their mates, and used them for food.

The black widow spider gets her name from her preference of living alone. Males may easily be found in the pineapple fields, but their webs are small and poorly formed, usually placed down on the mulching paper, at the base of the plant. He is a very tiny little creature, about one-fourth the size of his more husky mate. Thus, nature has made it possible for her to devour him, as soon as she has finished with his services.

About one week after mating, the female constructs her first cocoon, in which she places hundreds of eggs. Apparently only one mating is necessary, for once started she is very prolific, forming a new cocoon each week. As many as fifteen of these egg-sacs have been made by one female confined in a glass jar. Since it only requires a month or so for the young to grow up, it is easy to see what tremendous possibilities of multiplication they have. This is especially true under the favorable climatic conditions of the tropics, with few natural enemies present.

From countries where these spiders are found, there are many reports dealing with the venomous character of their bite. These state that the sting causes fatigue for three or four days, sometimes partial paralysis and even death. In order to verify these reports Dr. Nils P. Larsen, head of the Queen's Hospital, Honolulu, experimented on rabbits and guinea pigs. When bitten these animals evidenced pain and appeared to be partially paralyzed and semiconscious. They recovered, however, in from four to six hours—none died.

A very fine article dealing with the black widow spiders appeared in Nature Magazine (N. Y.) for September, 1929. The author, after experimenting on white rats, permitted a spider to bite his finger. He felt a sharp pain, almost immediately, and in twenty minutes it had extended to the shoulder. In about two hours, there was considerable pain in the chest and hips, followed by difficulty in talking and breathing. In about five hours, the

pain had spread to the knees and it soon extended to the toes. All this was accompanied by a low fever. The experimenter found relief by bathing in hot water, and thus spared himself considerable pain. He stated, that it is only under the greatest provocation that the spider can be made to bite humans.

The Use of Arsenic in Mosquito Control

BY J. F. ILLINGWORTH

(Presented at the meeting of December 12, 1929)

A matter that has given us some trouble in the greenhouses is the mosquitoes *Aedes aegypti* (Linn.), breeding in our water cultures. I experimented by applying Paris green at the rate of about one part to a million of water. This was very effective in destroying the wrigglers, but the pineapple roots were also injured by it. I then tried lead arsenate, which is only slightly soluble, using the same strength. This gave perfect results. The mosquito wrigglers soon died and there was no apparent injury to roots.

Paris green was first used for the control of Anopheles larvae by M. A. Barber and T. B. Hayne*. Their experiments showed that this chemical was more effective than calcium arsenate, arsenate of lead or arsenious acid. Airplane dusting for the control of malaria mosquitoes began in 1923.** It is now used over extensive areas of marshes by the U. S. Department of Agriculture. Since so small an amount of the poison is effective, some form of inert dust is required as a diluent and carrier. For this purpose a finely ground silica earth found to have about the same density as Paris green, proved very satisfactory; dilution 1 of the poison to 100 of the dust.

Such light applications of Paris green showed no injurious effects upon vegetation in the marshes. Furthermore, the treated waters were proved harmless to stock. My problem in the greenhouses, however, was somewhat different. I had tender pineapple roots suspended in water cultures, usurped by mosquito larvae. The value of the less soluble lead arsenate in such cases has been demonstrated.

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* Arsenic as a larvicide for anopheline larvae. In U. S. Pub. Health Serv., Pub. Health Rept. Vol. 36, pp. 3027-3034. 1921.

** W. V. King and G. H. Bradley. Airplane dusting in the control of malaria mosquitoes. U. S. Dept. Agr. Circ. 367, April, 1926.

New Species of Hawaiian Cerambycidae. (Col.)

BY DR. R. C. L. PERKINS

(Presented by title by O. H. Swezey at the meeting of December 12, 1929)

Plagithmysus rubi, n. sp.

Rufescent, head largely blackish, stalk of hind femora pale, yellowish; the pale sutural pubescent lines of the elytra on their apical part are slightly flavescent and fairly distinct, widened towards their basal extremity, in front of which the cuticle is apparently darkened; the base of the elytra is moderately, but not densely clothed with flavescent hairs, which hardly extend so far back as the ends of the sutural lines, and, as the sides of the elytra adjoining these are only sparsely hairy, the lines themselves are quite well defined.

The single example seen is not in very good condition and evidently somewhat immature, as the hind tibiae are much curved and very pallid, while the hind tarsi are wanting. If this example is an average-sized specimen of its species, it is the smallest Plagithmysus known (hardly 6 mm. to apex of elytra) but the absence of the hind tarsi might cause some doubt as to its position generically.

Face moderately clothed on either side of the middle line, the antennae inconspicuously hairy, the bristles on the lower side of the basal flagellar joints not long, nor closely placed. Pronotum subparallel-sided, appearing slightly elongate; median crest in lateral view with nearly straight outline dorsally, not or hardly more prominent in front; the vittae bordering the crest on each side evident, but not at all dense, the sides of the pronotum exterior to the sublateral ridges, almost evenly clothed with pale pubescence, less dense than the vittae and leaving a bare, smooth, impunctate line or space near the middle; scutellum with pale pubescence, denser round the margin. Elytra densely punctate right to the lateral margins. Hind femora clavate, widening very gradually from near the basal third of their length to near the apex, with inconspicuous, short pubescence; hind tibiae with copious and conspicuous, bristly, black hairs, metapleura apically and sides of the intermediate sternites with dense pubescent spots, the latter otherwise hardly pubescent.

Hab.—Olinda, Maui, Feb. 27, 1926, ex *Rubus hawaiiensis* (Swezey). The single example, judging by the elongate subapical joints of the antennae, is a male, and appears to me to be clearly referable to Plagithmysus in spite of its minute size. Type in the collection of the Hawaiian Entomological Society.

Plagithmysus similimus, n. sp.

The description of *P. molokaiensis* Perkins (Proc. Haw. Ent. Soc., VI, p. 475, 1926) will in most respects serve for the species for which the above name is proposed and which is hardly more than a race of the Molokai insect. I have seen only six specimens, and four of these were extracted dead from the pupal cells, one being much distorted and useless for com-

parison, while the three others differ in some respects from those which emerged naturally.

So far as I can judge on comparison with a pair of *molokaiensis* which were temporarily retained by me, the Maui insect is more robust, with the clothing of the hind tibiae distinctly denser, the pubescent lines of the elytra paler, less distinctly yellow, and more widened at the point of the divergence anteriorly, so that the furcation appears broader and more shallow. The base of the hind femora also is less pale as compared with the general color of these parts. As a rule there seems also to be some difference in the elytral sculpture, but both species vary in this and other points of structure.

The male of the two specimens which emerged naturally has the ovate dorsal area more or less divided by an ill-developed pale vitta on either side of the median crest, between this and the curved sublateral ridges, and the elytra have a rather dense clothing of pale hairs over the whole surface, but denser along the suture on the apical half or more, where they diverge outwardly to form the usual furcate marking, but less distinctly than is usual, owing to the number and similarity of the hairs on the adjoining parts. Also these sutural lines of denser hairs are continued along the suture within the furcation to reach the scutellum, as can easily be seen in some aspects, though hardly noticeable in others. It may here be noticed that in *P. molokaiensis* pubescent vittae appear to be usually present between the median crest and sublateral ridges, but they may be entirely wanting.

In the female of the bred pair the sutural pubescent lines and their furcation are much more definite than in the male, owing to the fact that the surface adjoining the lines and bordering the furcation is bare or at any rate less pubescent than the rest of the surface. The hind femora appear to differ little in the sexes, though rather more slender in the female, and, so far as the specimens before me are concerned, they appear to be rather more robust than in the Molokai form. Length 12-15 mm.

Hab.—Maui; the larvae were collected by O. H. Swezey in a dead Pipturus tree along the Kula Pipe Line trail east of Olinda. June 12th and 14th, 1927. The female I have specially referred to above emerged on August 5th, the male about July 20th, 1927. The other four were taken dead from the pupal cells. Type in the collection of the Hawaiian Entomological Society.

Neoclytarlus raillardiae, n. sp.

Black or brown-black, the more apical parts of the elytra often appearing paler than the general surface. In dorsal aspect the insect appears largely glabrous and more or less shining, often strongly so, while about at the middle of the length of the elytra there is a sufficient development of white setae to form an indefinite and irregular or more or less interrupted and vague triangular fascia; behind this, sparse white setae are disposed irregularly and are variable in number; on the basal part there are also, as a rule, some white setae, but apparently these are sometimes wanting altogether. The antennae, tibiae and tarsi are often all more or less pale, but variably so.

The pronotum is bare or has at most a few white setae in addition to the usual long fine hairs that are observable at the sides; the sculpture is variable, with much closer, coarser and rougher puncturation in some examples than in others, and, in fact, the surface may be largely smooth with fine and remote punctures and it also varies in other respects, though always appearing practically glabrous in dorsal aspect; the scutellum is without noticeable pubescence. Elytra under a strong lens coarsely punctured; on the more apical portion the punctures become shallower and less distinct and towards the suture more rugose; the hind femora, on their thickened part or club, are clothed with long, thin, pale hairs and not with appressed ones, while the club itself is less definite than in typical species of Neoclytarlus (e. g., *fragilis*, etc.) and the thin basal portion is not conspicuously pallid as in these, and in fact in some specimens is entirely dark and almost concolorous with the club. The abdomen beneath is clothed with long thin hairs, neither the sides of the sternites nor the metapleura bearing any spots formed by dense pubescence. Length 5.5-8 mm.

Hab.—Maui, summit of Haleakala, June 17, 1927 (Swezey). The beetles were beaten from clumps of half-dead *Raillardia ciliolata* bushes, and larvae were found in dead stems. I have examined a dozen examples of this obscure species. Type in the collection of the Hawaiian Entomological Society.

Neoclytarlus geranii, n. sp.

Blackish or dark fuscous; antennae for the most part, tibiae and tarsi more or less, pale, testaceous to reddish in color. The insect is well clothed with white or whitish hairs, on the ventral surface more closely and evenly than above, on the elytra most densely on a rather wide band near the middle, which forms a more or less distinct fascia, according to the density of the hairs on the ventral side of this, the clothing on the basal part being variable in density. The general appearance is that of a large specimen of *obscurus, filipes* or *mediocris*. The two examples examined are practically similar in the development of the hind femora and in the length of the subapical antennal joints and appear to be both males, one of which has the median white fascia of the elytra much more definite than the other.

Pronotum subglobose; median crest somewhat conical in front; viewed laterally it is prominent there, and the outline distinctly concave from front to rear; the clothing is white and rather evenly distributed, but becomes more or less fuscous or mixed with fuscous medially; antennal clothing ordinary, the hairs not particularly long, directed obliquely from the joints. Elytra with the punctures not coarse, and only distinctly seen in certain aspects; the scutellum is well clothed with appressed white hairs. Hind femora rather strongly clavate, but the club is notably longer and more gradual than in the typical species of Neoclytarlus, named above; it is clothed with appressed white hairs, and there is a well-developed fringe of long hairs on the femora beneath; hind tibiae with ordinary clothing. Beneath the whole body is densely clothed with appressed white hair, the abdominal segments being almost evenly covered throughout their whole width. Length 8-9 mm.

Hab.—Haleakala, 6000 ft., Maui, June 15 (Swezey). The beetles were beaten from clumps of *Geranium trifida*. Larval burrows and exit holes were found in dead stems. Type in the collection of the Hawaiian Entomological Society.

Neoclytarlus indecens Perkins.

The above-named species from Oahu was originally described mainly from a single captured specimen, but three bred specimens in indifferent condition, and more or less immature, were also used. Later, I described as distinct a very similar insect, *Neoclytarlus smilacis* Perkins, from Maui on the examination of two bred specimens, but without the opportunity of actual comparison with the Oahuan species. Since that time I have received from Mr. Swezey five more specimens from Oahu, all bred from Smilax, two being crippled and distorted, but two females are in good condition, and one male, though pale and immature-looking, having been extracted dead from the pupal cell, appears to be normal.

From Molokai, eight specimens, mostly in good condition, were bred from the same plant. It is quite certain that the examples from the different islands, if they really represent distinct species, are extremely closely allied, and if they should prove identical will furnish an exception to the rule that no species of the genus is found on more than one island, but further material is necessary to decide this. The more recent male from Oahu, above referred to, agrees in the clothing of the pronotum with the one described from Maui, but would appear to have a much greater development of the elytral clothing.

Males from Molokai may be said to be practically glabrous on the pronotum and elytra except for some small development of yellowish hair along the basal margin of the latter, and in this respect the females are similar. The latter vary in sculpture and color, but I cannot detect in them the short decumbent yellowish hairs which occur along the suture on the apical half of the elytra in the specimens from Oahu. To the Molokai examples I give the name *indecens* var. *kainaluensis* nov.

Hab.—Oahu, originally obtained from the Waianae range, the more recent specimens from Kahana, Sept. 4, 1927 (Swezey); the var. *kainaluensis* as larvae from Kainalu, Molokai, July 28, 1927, 2000-3000 ft. (Swezey). Type of the new var. in the collection of the Hawaiian Entomological Society.

Litomastix floridana (Ashm.), a Recent Immigrant in Hawaii

BY O. H. SWEZEY

(Presented at the meeting of May 2, 1929)

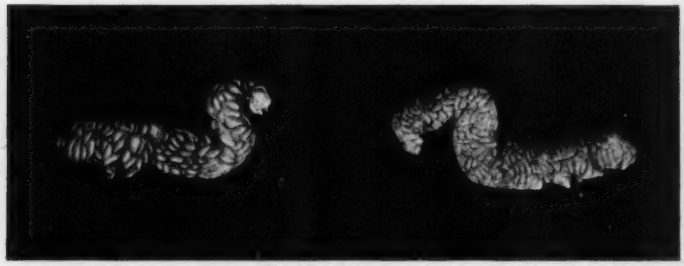
The existence of this insect in Honolulu first came to the writer's attention when a *Plusia chalcites* caterpillar collected on roadside weeds on McCully St., Honolulu, was found on Feb. 27th to be dead and its skin packed full of parasite larvae. A similar Plusia larva was found the next day on geraniums at 2048 Lanihuli Drive, Manoa Valley, and several of them were found March 1st on *Datura arborea* at the grounds of the Experiment Station, H. S. P. A. From all of these parasitized caterpillars hundreds of parasites matured and issued in due time.

On examination and comparison with the account given by Riley in the Report of the Entomologist, Dept. Agr. Report, 1883, p. 121, Pl. XI, figs. 5, 6, it seemed to be the same as the *Copidosoma truncatellum* (Dalman) there treated and figured. As no description was to be found in the literature available, specimens were sent to Mr. P. H. Timberlake, Riverside, Calif., for determination. In his letter of April 1st, he considers our insect to be *Litomastix floridana* (Ashm.), and that it is really the same as is called *Copidosoma truncatella* in American entomological literature, but this latter is the name of a European species, and he thinks that it has been used in error, and that the insect called by that name in America is a different species from the European, and he prefers to use the name *Litomastix floridana* (Ashm.) for it. Ashmead described *floridana* in the genus *Berecyntus*, from Florida (Proc. U. S. Nat. Mus., *22*, p. 365, 1900). No host given. Girault puts *floridanus* in a new genus: Paracopidosomopsis (Psyche, 23, p. 49, 1916). This was on examination of specimens from Indiana, reared from cabbage Plusia larva. He gives distinctions between this species and the European *truncatellum*.

Riley gave a considerable list of hosts for *truncatellum* in Europe, but his own observations were on *Plusia brassicae* as a host. My experiments here to rear it on any other host than *Plusia* have all failed. This may tend towards demonstrating that we both were dealing with the same species, and helps to prove the Ameri-

can species as distinct from the European species with its large list of hosts.

This parasite belongs to a group that develop by polyembryony. For a detailed account of this method see an article by Silvestri: "Biologia del *Litomastix truncatellus* (Dalm.)," Bolletino del Laboratorio di Zoologia Generale e Agraria della R. Scoula Superiore d'Agricoltura in Portici, I, pp. 17-64, Tav. I-V, 1907. Oviposition takes place in the egg of the host; the caterpillar hatches and grows to maturity, and after spinning its cocoon it is soon killed by the enormous number of parasite larvae that have developed by this time by polyembryony, and as they pupate they pack the caterpillar skin solid full.



Plusia chalcites caterpillars packed full of larvae of *Litomastix floridana.*

The eggs of the following were used in attempts to secure oviposition by this parasite: *Spodoptera mauritia, Cirphis unipuncta, Lycophotia margaritosa,* Cabbage butterfly, Monarch butterfly. The parasites paid no attention to any of these eggs, but gave immediate attention to the eggs of *Plusia chalcites* when they were provided. On March 3, 8 eggs were oviposited in by Litomastix. The caterpillars hatched from these on March 5-7. Three died in about a week, but the other 5 were carried through to maturity. They spun up to pupate March 23-27, and all soon showed parasitism by Litomastix. From one caterpillar a few adult parasites issued April 4, and the total emergence was the following day—33 days from oviposition. Several hundred adult parasites issue from each caterpillar. As many as 900 have been counted.

Plusia caterpillars were collected at various places and times to secure the parasites for distribution to the other islands:

H. S. P. A.	Mar. 1	25	caterpillars	collected	64%	had	Litomastix
Lanihuli Drive	Mar. 18	8	"	"	50%	"	"
Lanihuli Drive	Mar. 30	6	"	"	50%	"	"
Woodlawn	Apr. 2	14	"	"	28%	"	"
Upper Manoa Rd.	Apr. 13	1	"	"	100%	"	"
Woodlawn	Apr. 14	36	"	"	36%	"	"

About 20,000 parasites have already been distributed to the other islands.

Apparently this parasite was introduced previously by Koebele in 1898 from the eastern United States. Its introduction is mentioned under the name *Copidosoma truncatellum,* and 20,000 were liberated. (See Report of the Entomologist of the Hawaiian Government, for 1898. Report of the Minister of the Interior to the President of the Republic of Hawaii, for 1898, pp. 78-88, 1899.)

I cannot think that the present finding of this parasite can be the result of that introduction. If it had been established here all these years, we certainly would have known it long ere this, for *Plusia chalcites* is one of the common garden insects, its caterpillars feeding on many garden and ornamental plants and weeds. The parasitized caterpillar in the cocoon on a leaf is a conspicuous object that would not have escaped notice. It is more reasonable to think that recently a parasitized Plusia caterpillar has arrived from California, spun up in some kind of leafy vegetables, and the parasite has become established from this source.

Moths in Electric Light Globe

BY O. H. SWEZEY

(Presented at the meeting of December 12, 1929)

The following moths were obtained from an electric light globe at Mr. G. R. Carter's house, Kulamanu, Makawao, Maui, Oct. 13, 1929, by Mr. E. M. Ehrhorn:

2 *Aletia unipuncta* (Haw.)
1 *Caradrina reclusa* Walker
1 *Plusia biloba* Stephens
1 *Scotorythra syngonopa* Meyr.

3 *Omiodes demaratalis* (Walker)
3 *Omiodes localis* (Butl.)
254 *Orthomecyna exigua* (Butl.)
1 *Nomophila noctuella* Schiff.
10 *Scoparia* spp. (Too much rubbed for identification)
46 *Platyptilia lantana* Busck
3 *Phthorimaea operculella* (Zell.)
2 *Stoeberhinus testaceus* Butl.
303 *Crocidosema plebiana* Zell.
2 *Crocidosema lantana* Busck
1 *Amorbia emigratella* Busck
4 *Petrochroa dimorpha* Busck
13 *Pyroderces rileyi* (Walsm.)
4 *Opogona omoscopa* (Meyr.)

Haleauau Valley, the Locality Where the Rev. Thomas Blackburn Collected in the Waianae Mountains

BY O. H. SWEZEY

(Presented at the meeting of April 4, 1929)

In a recent letter from Dr. Perkins, mention is made of his having recently ascertained that Haleauau Valley was the locality in which Blackburn collected in the Waianae Mountains, Oahu. It seems desirable to make record of it here. It probably is best to quote from Dr. Perkins' letter:

"I have obtained a very full general account of Blackburn's Waianae trip from a long letter (illustrated with sketches) written in 1877 by my father-in-law (A. L. Atkinson) to a lady in England. He, Captain Mist and Blackburn camped there together that year for several days—longer than Blackburn states, I think, but one day was Sunday, when Blackburn did not collect, and one day was very wet and impossible. The locality was the Haleauau Valley. I myself camped there for a day or two (about 1902) only higher up the valley—I very much regret that I was never able to return there, as there was one particular slope covered with a great variety of trees, which I particularly noted, as likely to produce new Longicorns and Proterhini. As it was, I went there specially to obtain a good series of the bird *Oreomyza maculata*

for the Cambridge Museum, and to find out certain details as to the change of plumage in this bird. I knew that the bird was there, as in a visit in 1892 to the place (from Waialua) I had obtained young specimens, but no adult male. On that occasion I had gone to Haleauau and back in the day on foot from Buick's ranch (near where Haleiwa Hotel was built afterwards), a very long distance, and leaving me only a short time for actual collecting, and I was only after birds. If you or any of the others can get some beating done in one of these patches of varied forest, I think you will easily find all the Coleoptera that Blackburn obtained by that means—especially his *Mirosternus* and *Proterhinus,* and other good things. I am much interested in this, because, so often, my own Waianae Mountain species did not properly agree with his, though I considered them the same, and I suspect this was probably because they came from different localities. The most interesting thing I got on my trip to Haleauau was a single *Metrothorax*. I think I called it *carteri,* but as I have said, I had no time there for insect collecting."

You may be sure that after reading this I was much interested in ascertaining the location of Haleauau Valley. I could not find any such name on any map available. On inquiring of Dr. C. M. Cooke, Jr., of the Bishop Museum, I found that he had long been familiar with the name for a region where he had collected shells of many kinds. It is that large valley which is crossed by the present trail to Mt. Kaala, before beginning the first steep ascent: The trail crosses the stream bed at about 2,000 feet elevation, a mile or more beyond the firebreak trail on the mauka side of the Artillery Target Range. There is usually a running stream of water at the crossing. The valley above the crossing is filled with a jungle largely composed of native vegetation. The upper part has a wide expanse with numerous tributaries and the northern extension lies directly to the south of Kaala summit. The valley is well wooded, especially on the southern side, and looks like a very desirable place for insect collecting. None of the entomologists now here have penetrated beyond the trail crossing at the 2,000-foot level. Usually when passing this way it has been on a trip to Kaala, and there would be no time for exploring the valley. However, it has been found good collecting along the trail leading out

from the stream crossing as the trail passes through the lower part of the well-forested area. In the valley bottom below the 2,000-foot trail crossing the vegetation is mostly guava and lantana and Ipomoea vines. Probably in Blackburn's time it may have been good forest here, and he may have collected in this, perhaps not attaining the region beyond the 2,000-foot level. Dr. Cooke tells me that he remembers when there was good forest very much lower down in the valley than now.

For my part I shall take a greater interest in this particular region, and endeavor to penetrate the jungle farther up the valley for insect collecting. Apparently there is a large forest area that has not been visited by entomologists, and should yield new and interesting forms. It was near the 2000-foot trail crossing that Dr. Williams and myself carried home a block of wood from a dying Sideroxylon tree from which issued several specimens of Plagithmysus which Dr. Perkins later described as *muiri*. From the same locality I recently brought back several grubs from dead Pipturus and reared *Plagithmysus kuhnsi* Perkins, which was previously known by a single specimen. Then higher up on the north side of the valley along the Kaala trail at 3000 feet is where *Nesithmysus bridwelli* Perkins, was first collected, and later reared from large grubs in Pelea trees. One can anticipate that there are more species of this family of beetles remaining to be discovered in this large unexplored area.

A Spider Eating Ant Larvae or Pupae

BY DR. F. X. WILLIAMS

(Presented at the meeting of September 5, 1929)

Woodlawn, Honolulu, Sunday morning, August 18, 1929.

Prenolepis bourbonica Forel, a common and very active black ant, was observed changing its domicile from a cement plant box of soil at one end of my lanai coping to a small pot containing a young Pritchardia palm as well as a Sadleria fern that had just pushed its single frond through the soil. The opening thus made by this emerging fern head had been chosen by the ants as a portion of their nest or place of refuge. There was quite a stream of ants plying between the cement box and the flower pot, and here and there in the column was an ant bearing a white larva or pupa of its own kind and again, when the procession became denser, males and queens, some few of the latter wingless, could be seen running along with the rest towards the flower pot.

A medium large attid (salticid) spider in black and pale brown livery stood near by, its legs raising the body well off the cement. Evidently interested in the stream of hurrying insects, nevertheless it maintained the alertness of its kind and permitted no ants to wander too near its person. It soon became evident that the spider was robbing the ants of their young for, perceiving from a distance of several inches a white burden that passed before it, it would quickly but carefully approach this morsel—providing not too many ants were about it—would sidle in position so as to face the ant carrying the larva or pupa, and hastily attempt to grasp the latter. Usually the spider, after one or two such trials, succeeded in pulling the burden loose from its carrier and then it would retire to enjoy the tidbit. Four such pilferings were thus observed; once, however, the spider failing in her attempt was considerably discomforted by the stubborn ant that refusing to let go the babe was dragged along with it until she gave the spider a dose of formic acid; the arachnid retired from her activities for some time and held the tip of one foreleg to her

mouth, evidently washing it. Several less disastrous failures were also witnessed. A robbed ant would rush about wildly for a time.

This ant gives way to the smaller and more numerous *Pheidole megacephala* (Fabr.), and I have seen it with its young and queens clinging to the tips of a small bush while the invading Pheidole had not yet reached this refuge.

The warm, moist evenings of August 26 and 27 have been swarming time for the ant *Prenolepis sharpii* Forel. Numerous examples were attracted to lights in the house. *Pheidole megacephala* thereby became more abundant indoors in the living room. On the cement hearth there, I observed a large hunting spider, *Heteropoda regia* (Fabr.) standing high on its legs—on tiptoes, one might say—the reason being several Pheidole workers running about under and near her. She appeared safe, but lifted one and the other of her foremost legs when ants became too inquisitive. The ants would not do more than stop a moment at her pedal extremities and made no attempt to scale them. I flicked several queen Prenolepis to, or across where she stood, and on two or three occasions the spider stooped down suddenly on all her legs to grab the ant. Thus she consumed several, so they could not have been very distasteful. The spider resumed her stilted posture as soon as a queen ant was captured. She might have avoided the Pheidole by rushing elsewhere, but when I disturbed her about half an hour after I first saw her she was still standing with her body raised well off the floor.

Elateridae from New Guinea and New Britain in the Collections of the H. S. P. A. Experiment Station

BY R. H. VAN ZWALUWENBURG

(Presented at the meeting of December 12, 1929)

A considerable number of beetles of the family Elateridae, collected by Dr. Fred Muir, Mr. C. E. Pemberton and others, in New Guinea and New Britain, have accumulated in the collections of the Experiment Station of the Hawaiian Sugar Planters' Association. Of the some hundred species of this family previously known from that general region, twenty-eight are represented in these collections. In this paper there are added to the known Elaterid fauna of the New Guinea-New Britain region six new species and one new genus. All the types are deposited in the type collection of the Hawaiian Entomological Society in Honolulu, T. H.

The well-recognized affinities between the insect fauna of New Guinea and that of Australia are shown, among the click-beetles, by the preponderance in the New Guinea lists of species of Adelocera (Lacon), Alaus and Monocrepidius, all of which are well represented on the southern continent. New Britain has attracted fewer collectors, and its Elaterid fauna is less well known than that of New Guinea. The rather meagre evidence contained in this paper suggests that it is not very different from the New Guinea fauna.

AGRYPNUS Eschscholtz

1829, Thon. Arch., vol. 2, pt. 1, p. 32.

Type—*Elater tomentosus* Fabr.

1. **A. aequalis** Candeze. (1857, Mon. des Elat., vol. 1, p. 25).

Six specimens from the Sharp collection collected by Pratt, without further locality than New Guinea. All these have the tips of the elytra slightly emarginate, a variable character.

2. **A. resectus** Candeze. (Idem, p. 45).

Two specimens: one taken by Pemberton in August, 1928 at Port Moresby, New Guinea; the other, a male in the Sharp col-

lection, has the aedeagus dissected out and mounted on a card. This aedeagus is described and figured in Sharp and Muir's paper on the male genitalia of Coleoptera under the name of *Agrypnus* sp. (Trans. Ent. Soc. London, 1912, p. 545, pl. lxvi, fig. 154).

3. A. soricinus Candeze. (1881, Elat. nouv., fasc. 3, p. 1).

A single specimen collected by Pemberton near Rabaul, New Britain, March-May 1929. Originally described from western New Guinea.

ADELOCERA Latreille.
1829, Cuvier's Regne Anim., vol. 4, p. 451.
Type—*Elater ovalis* Germar.

4. A. asperulata (Candeze). (1878, Ann. Mus. Genova, vol. 12, p. 103).

Four specimens collected by Pemberton at Koitaki, New Guinea, 1500 feet, October-December 1928.

5. A. cinerascens (Candeze). (Idem, p. 103).

One specimen from Koitaki, 1500 feet, October-December 1928; Pemberton, coll.

6. A. gracilenta (Schwarz). (1902, Deut. Ent. Zeit., p. 106).

Twenty-six specimens, mostly from Koitaki, 1500 feet, October-December 1928; a few from the Rigo district and from Port Moresby, New Guinea, and four from near Rabaul, New Britain, February 1929; all collected by Pemberton.

7. A. gracilis (Candeze). (1874, Revis. de Mon. des Elat., p. 83).

Upwards of fifty specimens collected by Pratt, and by Pemberton at Port Moresby, Kikori, Koitaki (1500 feet), middle Fly River, and Rigo district, New Guinea; and near Rabaul, New Britain.

8. A. insularis (Candeze). (Idem, p. 74).

A single specimen, slightly larger than called for by Candeze's description; from Koitaki, 1500 feet, October-December 1928, Pemberton, coll. This small species occurs not only in New Guinea, but also throughout the Malay Archipelago from Malacca eastward to the Moluccas.

9. **A. limosa** (Candeze). (1881, Elat. nouv., fasc. 3, p. 10).

Ten specimens collected by Pemberton at Koitaki and in the Rigo district, New Guinea, October-December 1928. Four other specimens: three from near Rabaul, New Britain, and one from Port Moresby, collected by Pemberton, I identify as *limosa* with some doubt. They may be *setulosa* (Schwarz), but although they are somewhat rubbed, the rather erect hairs on the posterior lateral regions of the elytra hardly can be termed bristles.

10. **A. pupilla** (Candeze). (1892, Ann. Mus. Genova, ser. 2, vol. 12, p. 802).

One specimen collected by Pemberton at Koitaki, 1500 feet, October-November 1928. This species differs from *gracilis* in having the carina of the posterior angle of the pronotum short, instead of prolonged almost to the anterior border.

11. **A. rectangula** (Schwarz). (1903, Deut. Ent. Zeit., p. 378).

Six specimens collected by Pemberton at Koitaki, October-December 1928.

12. **A robusta** (Schwarz). (Idem, p. 377).

One specimen taken by Pemberton at Koitaki.

13. **A. scopa** (Schwarz). (1902, Stett. Ent. Zeit., p. 200).

Four specimens, Koitaki, 1500 feet, October-January; Pemberton, coll.

14. **A. subsericea** (Candeze). (1878, Ann. Mus. Genova, vol. 12, p. 102).

One specimen collected by Muir at Laloki, New Guinea, in 1909.

ALAUS Eschscholtz.

1829, Thon. Arch., vol. 2, pt. 1, p. 32.

Type—*Elater oculatus* Fabr.

15. **A. cerastes** Candeze. (1865, Elat. nouv., fasc. 1, p. 16).

A single specimen in the Sharp collection, taken by Pratt, and labelled New Guinea.

16. **A. infumatus** Candeze. (1874, Revis. de Mon. des Elat., p. 144).

One specimen taken at Laloki, New Guinea, by Muir in 1910.

17. A. obliquus Candeze. (Idem, p. 143).

A single badly rubbed specimen in the Sharp collection, New Guinea, Pratt, coll.

18. A. scops Candeze. (Idem, p. 137).

One specimen taken by Pemberton at Koitaki, 1500 feet, November-December 1928.

CAMPSOSTERNUS Latreille.

1834, Ann. Soc. ent. France, vol. 3, p. 141.
Type—*Elater fulgens* Fabr.

19. C. papuensis n. sp. (Pl. VI, fig. 1).

Broad; glabrous; very shiny throughout. Dark coppery green, with outline and posterior angles of pronotum, as well as scutellum and anterior part of elytral suture, blue-green. Purplish bronze tint over most of pronotum, and near base and along sides of elytra. Front strongly, triangularly, impressed. Antennae bluish black with first joint blue-green.

Pronotum broader than long (even along median lines); convex; coarsely margined; depressed along lateral margins and at posterior angles with two vague impressions on either side on rear of disc. Punctation extremely fine and sparse everywhere except antero-laterally. Trapezoidal, sides nearly straight, though faintly sinuate, from (and including) the posterior angles to the anterior third, thence roundly narrowed to anterior angles. Posterior angles broad and short, not carinate; divergent and straight-sided except for incurved tips. Scutellum transverse; faintly biimpressed.

Elytra as wide as posterior angles of pronotum; shoulders prominent; lateral margins nearly straight to middle; elytra somewhat concave behind the humeri. Interstriae toward the base suggested by vague longitudinal elevations; their punctation very fine and of the same size as those representing the striae. Apices divergent, spinous.

Underside of body bluish green; legs bluish green except for tarsi which are blackish with fulvous pubescence.

30 mm. long; 10.5 mm. wide.

Holotype male (?) (genitalia missing). From Sharp collection, taken by Pratt in New Guinea.

So far as I know this is the first record of this genus from the region east of Java, Borneo and the Philippines. There is, of course, the possibility that the specimen is mislabelled, and that I have failed to recognize an already described species.

PSEUDOTETRALOBUS Schwarz.
1902, Stett. Ent. Zeit., p. 210.
Type—*P. dohrni* Schwarz.

20. P. dohrni Schwarz. (1902, Stett. Ent. Zeit., vol. 63, p. 211).

One specimen from New Guinea in the Sharp collection; Pratt, coll.

PROPSEPHUS Hyslop.
1921, Proc. U. S. N. M., vol. 58, no. 2353, p. 666.
Type—*Psephus beniniensis* Candeze.

21. P. chatanayi (Fleutiaux). (1917, Bull. Soc. ent. France, p. 231).

One specimen taken by Pemberton at Koitaki, 1500 feet, October-November 1928, and another in the Sharp collection taken by Pratt, New Guinea.

22. P. papuensis (Candeze). (1881, Elat. nouv., fasc. 3, p. 35).

Six specimens collected by Pemberton at Koitaki, 1500 feet, October-December 1928.

SIMODACTYLUS Candeze.
1859, Mon. des Elat., vol. 2, p. 169.
Type—*Aeolus cinnamomeus* Boisduval.

23. S. pembertoni n. sp.

Slender, rather shiny; pubescence yellowish-brown. Color castaneous, with middle of front darker; pronotum with three blackish vittae, roughly parallel to posterior third where the lateral ones incurve; anterior margin of elytra, the scutellum, and the tip of each elytron, fuscous to black. Front gently convex, coarsely and closely punctate. Antennae short; 3rd joint a little longer than the 4th.

Pronotum distinctly longer than wide, parallel on posterior half (except for the outcurved posterior angles), narrowed anteriorly from about the middle. Posterior angles long, acute, strongly bicarinate, the outer carina the longer. Punctuation even, close and rather fine. Medianly sulcate almost to the anterior margin. Scutellum elongate, tumid.

Elytra about as wide as posterior angles of pronotum; sides parallel to beyond middle, thence narrowed to apex. Elytra transversely convex, striae consisting of light linear punctures; intervals nearly flat posteriorly. Elytra diverging from sutural line at the apex, and each strongly emarginate at the tip, the outer angle of the emargination longer than the inner.

Body beneath blackish in general, with an irregular lateral castaneous

band along prothorax and abdomen. Legs castaneous, with tibiae and (in part) femora, blackish. Tip of last abdominal sternite concavely emarginate. Female 11 mm. long.

Type, near Rabaul, New Britain, March-April 1929, Pemberton, coll.

24. S. similis (Candeze). (1878, Ann. Mus. Genova, vol. 12, p. 111).

Five specimens collected by Pemberton near Rabaul, New Britain, March-May 1929. Originally described from Misori Island off the northwest coast of New Guinea.

HORIZOTEICHOS gen. nov.

Type—*H. papuensis* n. sp.

Elongate; head medium, directed forward and downward; front gently convex, its anterior margin broadly rounded. Labrum of ordinary form. Mandibles bifid; labial palpi with last joint triangular.

Antennae short, the joints, from the 3rd on, about as wide as long; 11th broadly rounded.

Prothorax transversely convex; posterior angles long, carinate.

Elytra transversely convex; apex widely emarginate.

Prosternal lobe medium; propectus nearly horizontal; prosternal sutures double, nearly straight, closed.

Margins of mesosternal cavity divergent, horizontal.

Posterior coxal plates rather abruptly widened inwardly, but without a toothlike extension on their posterior margin.

Tarsi slender, 1st joint rather shorter than the four following together; 4th joint plainly but briefly dilated; 3rd slightly dilated.

This genus falls within the subfamily Pachyderinae. The tarsal lobe is less developed than in Glypheus Candeze, and the front is gently convex and very finely punctate.

25. H. papuensis n. sp. (Pl. VI, fig. 2).

Yellowish brown, with head, median pronotal vitta, tips of posterior angles, scutellum, sutural vitta and apical fifth of elytra, black. Front gently convex; finely and sparsely punctate. Pubescence fine, semi-erect and yellowish everywhere but on the head, pronotal vitta, scutellum and apical black area, where it is black. Pronotum shiny, slightly more rufous than elytra. Antennae short, barely exceeding posterior angles of pronotum in the male; 2nd joint small; 3rd about as long as the 4th, triangular; from 4th on, subquadrate, about as wide as long; 11th broadly rounded at tip.

Prothorax longer than wide; sides straight and narrowing gently to apical fifth, thence more strongly narrowed to apical angles. Posterior angles straight, diverging slightly from the line of the sides of the prothorax; bicarinate. Pronotum very finely punctate, even on the sides; deeply sulcate posteriorly along vitta. Scutellum longer than wide; subogival; somewhat tumid on its middle.

Elytra striato-punctate; intervals flat, very finely punctate. Apex widely emarginate, the inner and outer angles more or less equal.

Body beneath, black, except for propleurae, which are flavous, and the anterior lobe, which is dark yellowish brown. Legs with rufous cast. Lobe of 4th tarsal joint very small but distinct.

Male, 9.0 mm. long; female 9.5 mm. long.

Holotype male and allotype female, Koitaki, New Guinea, 1500 feet, October-November 1928; Pemberton, coll.

MONOCREPIDIUS Eschscholtz.
1829, Thon. Arch., vol. 2, pt. 1, p. 32.
Type—*M. pallipes* Eschsch.

26. **M. arouensis** Candeze. (1878, Ann. Mus. Genova, vol. 12, p. 112).

Two specimens collected by Pemberton within a 25-mile radius of Port Moresby, New Guinea, June 1928. Originally described from the Arou Islands, lying to the southwest of New Guinea.

27. **M. contiguus** Candeze. (Idem, p. 114).

Three specimens collected by Pemberton at Koitaki, October-November, and in the middle Fly River country, New Guinea, "250-300 miles up," July 1928.

MEGAPENTHES Kiesenwetter.
1858, Nat. Ins. Deut., vol. 4, p. 353.
Type—*Elater lugens* Redt.

28. **M. brunniventris** Candeze. (1892, Ann. Mus. Genova, ser. 2, vol. 12, p. 804).

One specimen collected by Pemberton within a 25-mile radius of Port Moresby, New Guinea, June 1928.

MELANOXANTHUS Eschscholtz.
1833, Dejean, Cat., ed. 3, p. 91.
Type—*Elater melanocephalus* Fabr.

29. **M. exiguus** n. sp. (Pl. VI, fig. 3).

Piceous, with anterior margin (especially toward the sides), posterior angles and base of prothorax, yellow-brown; elytra chestnut, yellow-brown at base. Pubescence thick, semi-erect, brownish. Antennae chestnut; short, not attaining the posterior angles of the pronotum. Front flat, slightly tumid above; coarsely and closely punctate; anterior margin broad, slightly recurved along the middle.

Pronotum convex, slightly flattened on disc; cribrate punctate; base sulcate; longer than wide; sides slightly sinuate on basal third, thence straight and gently convergent to anterior fifth, thence rounded to anterior angles. Posterior angles slightly divergent; broad; strongly unicarinate; tips rounded, not acute. Scutellum flat, granulate, fairly robust.

Elytra distinctly narrower than pronotum; narrowed from the humeri to beyond middle, thence more strongly to the apex; apex rounded; punctate-striate; intervals flat, granulate toward base.

Castaneous beneath, with legs flavous.

4.5 mm. long.

Holotype, Koitaki, New Guinea, 1500 feet, October-November 1928, Pemberton, coll.

Close to description of *flavangulus* Candeze (1865), but the pubescence is not griseous, and the elytra, even at the shoulders, are markedly narrower than the posterior angles of the prothorax.

30. M. glyphonides n. sp. (Pl. V, figs. 4, 4 a).

Black except for pale yellowish posterior angles of prothorax and flavous maculations on the following areas of the elytra: (1) on either side of scutellar fovea, (2) on the anterior third a suboval spot obliquely truncate anteriorly and occupying interstriae 3-6, and (3) on the posterior third of the elytra another roundish area occupying interstriae 3-9. Pubescence very fine, black except on flavous areas, where it is yellowish.

Front strongly convex; its anterior margin in the middle curved downward over the clypeus, and margined laterally by the sides of the deep parantennal foveae. This clypeal area tumid and clypshedral. Antennae short, not attaining posterior angles of the prothorax; joints progressively shorter from the 4th on, joints 2 and 3 small, subequal; 1 to 3 rufous, the rest black.

Pronotum convex, longer than wide; sides converging and straight from the tips of the posterior angles to anterior fourth, thence roundly narrowed to the anterior margin. Closely, evenly and broadly punctate. Strongly sulcate medianly at base. Posterior angles strongly unicarinate, the carinae blackish. Scutellum elongate, pointed behind, declivous.

Elytra rather coarsely punctate-striate; interstriae rugose on basal half. Apex briefly subtruncate.

Black beneath, with exception of prosternum and legs, which are rufous. Legs and claws simple.

3.5 mm. long.

Holotype female (?). Koitaki, New Guinea, 1500 feet, November-December 1928, Pemberton, coll.

The structure of the frontal margin suggests Glyphonyx, but besides other separating characters, the claws are simple, not pectinate.

ANCHASTUS LeConte.
1853, Trans. Amer. Philos. Soc., vol. 10, p. 459.
Type—*A. digitatus* LeConte.

31. A. nitidulus Candeze. (1878, Ann. Mus. Genova, vol. 12, p. 119).

One specimen collected by Pemberton at Koitaki, November-December 1928.

CARDIOPHORUS Eschscholtz.
1829, Thon. Arch., vol. 2, pt. 1, p. 34.
Type—*Elater ruficollis* L.

32. C. albipubens n. sp.

Head and thorax black, shiny; elytra dark reddish brown with shoulders and vague area on distal third, lighter brown; pubescence rather long, whitish. Front broadly concave in middle; finely and closely punctate. Antennae blackish brown with 1st joint rufous; 3rd joint a little shorter than the 4th. Pronotum convex; broader than long; finely, closely and unevenly punctate. Sides evenly rounded with greatest width across the middle; briefly but distinctly sulcate at base. Posterior angles directed straight backwards; carination short. Sulci well marked. Lateral sutural line fine and very brief.

Elytra broader than pronotum; strongly striate; intervals finely punctate, convex, not costate posteriorly. Underside blackish; legs rufous; claws dentate.

5.5 mm. long.

Holotype male, Port Moresby, New Guinea, August 1928, Pemberton, coll.

The lateral lobes of the aedeagus differ from those of *papuensis* in being not clavate toward the apex.

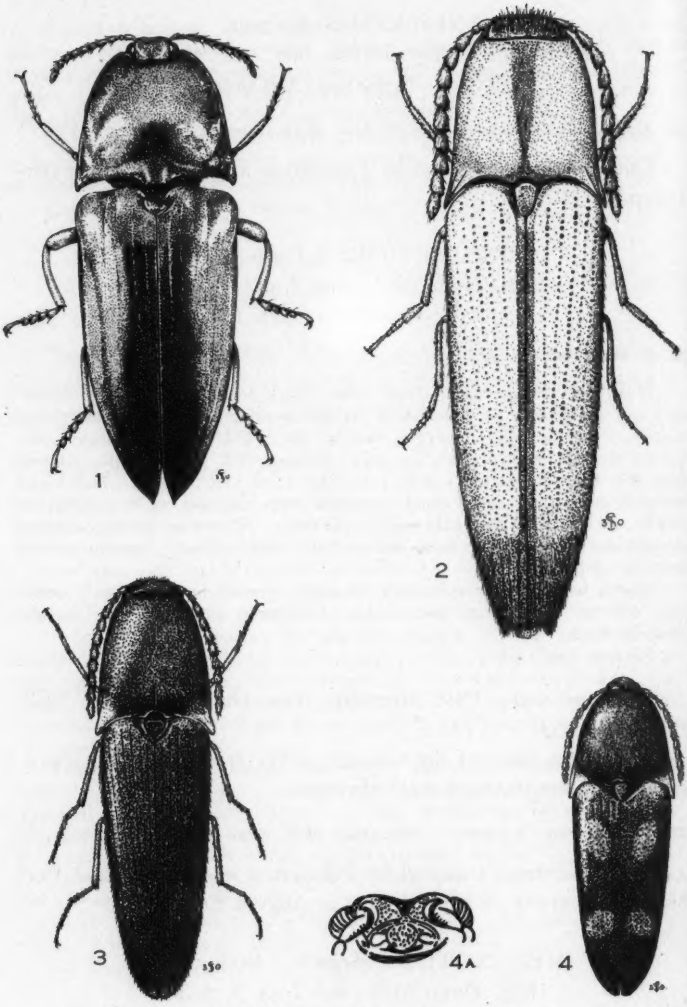
33. C. papuensis Candeze. (1878, Ann. Mus. Genova, vol. 12, p. 132).

Nine specimens collected by Pemberton in the Rigo and Port Moresby districts of New Guinea in August 1928.

MELANOTUS (Megerle) Eschscholtz.
1829, Thon. Arch., vol. 2, pt. 1, p. 32.
Type—*Elater fusciceps* Gyll.

34. M. albertisi Candeze. (1878, Ann. Mus. Genova, vol. 12, p. 135).

Four specimens, Koitaki, New Guinea, 1500 feet, October-December 1928, Pemberton, coll.



NEW ELATERIDAE FROM NEW GUINEA.

Fig. 1. Campsosternus papuensis (X 2.3).
Fig. 2. Horizoteichos papuensis (X 10.3).
Fig. 3. Melanoxanthus exiguus (X 13.7).
Fig. 4. Melanoxanthus glyphonides (X 13.4).
Fig. 4a. M. glyphonides, view of fronto-clypeal region.

On Some Psocidae from the Hawaiian Islands

BY NATHAN BANKS

Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

(Presented at the meeting of Feb. 6, 1930, by F. X. Williams)

The material is from two sources; some sent several years ago by Dr. Perkins, and others recently sent by Dr. F. X. Williams. In the museum collection is a set of the material used by Dr. Perkins for the Fauna Hawaiiensis.

Psocus distinguendus Perkins.

Mahena, Maui, Dec. 10.

Psocus kauiensis Perkins.

Manoa, Oahu, Jan.; Waipio Rdg., Oahu, Aug. 28.

Kilauella vinosa McLach.

Ulupalakua, Maui, Dec. 11.

Kilauella debilis Perkins. (Pl. VII, fig. 6).

Honolulu, April 11. Fully distinct from *K. vinosa.*

Kilauella micramaura Perkins. (Pl. VII, fig. 7).

Honolulu. I give a figure of my specimen which agrees closely with Perkins; the figure of Enderlein is of another species; Perkins distinctly mentions the union of areola postica with media.

Caecilius analis sp. nov. (Pl. VII, fig. 2; Pl. VIII, fig. 2; Pl. IX, fig. 3).

Body and legs pale; thorax above with a large dark stripe on each side, usually occupying most of the notum; clypeus of female usually brown, and sometimes a line up from it; antennae of male dark. Wings a nearly uniform grayish hyaline, the costal area and stigma more yellowish; the anal margin (axillar cell) fumose, almost dark brown; hind-wings hyaline. Venation similar to *C. ceylonensis,* but areola postica larger, and fork of radius longer than its pedicel. In the female the clypeus appears very large and prominent, the eyes scarcely projecting; in the male the eyes are enlarged, and less than diameter apart; the male antennae are thickened more than in female.

Length 3 mm.

From Manoa, Oahu, Jan.; Palolo, Oahu; and Honolulu, on sugar cane.

Hageniola gen. nov.

In Caecilinae; media and radius connected by a cross-vein; media with one branch, that going to the hind margin, forming a large cell; areola postica very small. The shape of the median fork is so different from Hemicaecilius that I cannot consider it the same, more probably it is an offshoot from Kilauella or Hageniella.

It might be mentioned that Hagen's *P. lanatus* is not a Hageniella (as supposed by Enderlein) but a Hemicaecilius.

Hageniola solitaria sp. nov. (Pl. VII, fig. 5).

Head, thorax, and abdomen brownish yellow, scarcely marked; head with fine, short, white hair; clypeus of female very prominent. Antennae pale yellow on basal third, beyond black. Legs pale. Wings faintly yellowish brown, veins scarcely darker, bristles on margin and veins, membrane with fine, short, brown hairs.

Length 2.6 mm.

From Honolulu, on cane, Jan. 17 (Williams).

Hemipsocus roseus Hagen. (Pl. VIII, fig. 1; Pl. IX, figs. 1, 2).

Honolulu, Jan., Feb., and April.

These agree with the Philippine specimens, and with the types from Ceylon. This genus should be placed in the Caecilinae.

Ectopsocus hawaiiensis Enderl.

Honolulu (Perkins).

Ectopsocus fullawayi Enderl. (Pl. VIII, fig. 4; Pl. IX, fig. 6).

Honolulu, Feb. 11; Kailua, Oahu, March 26. A very handsome species.

Ectopsocus perkinsi sp. nov. (Pl. VII, fig. 4).

Head, thorax above, and abdomen black; legs and antennae brown. Wings fumose, veins black in black parts. Several large white spots much as in *E. fullawayi*, but no basal pale band, and the band from stigma does not go obliquely across, and is interrupted; a large pale spot on hind margin just beyond end of anal vein, another larger one in second median cell reaching up across the fifth radial cell; a still larger spot beyond end of stigma; small spots in ends of outer radial cells. Hind-wings a uniform grayish. Head, antennae, and thoracic notum hairy.

Length 1.75 mm.

From Honolulu Mts., 1500 ft.

Psylloneura williamsi sp. nov. (Pl. VII, figs. 8, 9; Pl. VIII, fig. 6; Pl. IX, fig. 7).

Head and thorax yellow-brown, clypeus paler, head with scattered, short, white hairs. Head not as broad as in *P. simbayana*. Legs pale, tibia nearly white, tarsi brownish. Antennae pale, the elongate joints with short fine hairs. Abdomen yellow-brown. Wings hyaline, veins yellowish-brown; media and radius connected by a fairly long cross-vein; areola postica very long; in hind-wings the anal vein is a white line.

Length 1.3 mm.

From Ewa, Oahu, March 18, and Waialua, Oahu, Jan. 29, on sugar cane.

Echmepteryx costalis sp. nov. (Pl. VII, fig. 3; Pl. VIII, fig. 3; Pl. IX, fig. 4).

Wing with dark brown scales in middle, metallic and iridescent, of a nearly uniform color; along the costa is a narrow stripe of white, and along hind margin a broader stripe of white; the costal fringe is white, but just as the wing narrows there is a patch of brown, and that along the outer half of the narrowed tip is also brown; the fringe on hind margin is also white except that along the narrowed part is brown. The narrowed part of the wing is longer than that of any other species, about as long as width of wing. The head and thorax are clothed with grayish white hair and scales, the surface of head is pale yellowish. The antennae are thin, pale, and with short joints; the legs pale, with mostly white hair.

Length 2 mm.

From Ewa, Oahu, March 18, and Honolulu, Nov. 24, Jan. 12.

Echmepteryx marmorata sp. nov.

Wings rather broader than in *E. costalis*, with a narrowed tip hardly one-half as long as in *E. costalis*, the tip turned outward; clothed with scales of white, yellow or gold, brown, and black; a large area near the middle is dark, before it there is some white, some golden, but more pale brown scales, beyond it there are patches of white, with some of black scales, a band of golden scales just before the tip, with the fringes at this place also golden, the extreme tip black and with black hair. The costal fringe is mostly brown, but with some white and yellow; the fringe of hind margin is first brown, then white, then brown, then yellow; some of the erect hairs near base are white. Face with a broad, vertical stripe of white hair, on the sides dark brown; thorax with golden scales. Legs pale, each tibia with two dark bands, mid and hind tibia very bristly. Antennae rather short and thin.

Length 2.1 mm.

From Kualoa, Jan. 25, on Albizzia, and Honolulu, July 4.

Echmepteryx unicolor sp. nov.

In general shape of wings and in coloration it is very similar to *E. mihira* Enderl. The fore-wing is rather uniformly clothed with pale brown

or yellowish brown scales and hairs, the scales mostly elongate; costal fringe brown, at extreme tip almost black; fringe of hind margin also brown; hind wings with some dark hairs near tip, but extreme tip with snow-white hair. Surface of head brown, clypeus pale; most of face with brownish hair, but each side below there is white hair, and that on edge of vertex nearly yellow. Antennae pale, the elongate joints with inner bristles as long as the joints. Legs pale yellowish, femora hairy beneath, tibiae very bristly.

Length 2.3 mm.

From Honolulu, Hawaii (Perkins).

Cyptophania gen. nov.

Only fore-wings present, these appear as large scales, a little longer than the abdomen when dry (probably not when alive); about two and one-half times as long as broad, strongly convex, the tip pointed, clothed with curved, appressed hairs, and densely with erect ones of a nearly even length, some at tip nearly one-third the wing width; along costa, especially near the base, some of the appressed hairs are scale-like, but slender. No distinct stigma, nor areola postica; a diamond-shaped cell near middle of wing toward base, above it a curved vein makes a cell similar to Empheria, this gives off a branch to costa, beyond the cell the vein is soon forked and each forked again before tip. The apical venation and the cells are readily traced, but the venation of the posterior part is not as plain; from the cell are two branches, the outer one forked.

It is related to Psocinella, but shape of wings very distinct.

Cyptophania hirsuta sp. nov. (Pl. VII, fig. 1; Pl. VIII, fig. 7; Pl. IX, fig. 5).

Head with shaggy yellowish or golden hair; thoracic notum with yellowish hair; wings brown, finely, irregularly marmorate with yellowish in the apical half; legs pale yellowish. Antennae pale and thin, joints short, with short hair, at least thirty joints; no ocelli; eyes with many short hairs. Last joint of palpi broadened, triangular, hind legs much the longest, tibia much longer than femur; all femora compressed, and much broadened front femora not three times as long as broad; mid and especially hind femora with many long white bristles.

Length of fore-wing (when mounted) 1.5 mm.

From Honolulu, Nov. 10, and April, on sugar cane. Enderlein has described a Parempheria from the Islands (from alcoholic material); he says the venation is like *P. sauteri*, and it has hind wings, so it must be quite different from this form.

Explanation of Figures.

PLATE VII.

Fig. 1. *Cyptophania hirsuta*, wing, and a marginal hair.

Fig. 2. *Caecilius analis*, fore-wing.

Fig. 3. *Echmepteryx costalis*, fore-wing.

Fig. 4. *Ectopsocus perkinsi*, front-wing.

Fig. 5. *Hageniola solitaria*, fore and hind-wing.

Fig. 6. *Kilauella debilis*, fore-wing.

Fig. 7. *Kilauella micramaura*, fore-wing.

Fig. 8. *Psylloneura williamsi*, fore-wing.

Fig. 9. *Psylloneura williamsi*, hind-wing.

PLATE VIII.

Fig. 1. *Hemipsocus roseus.*

Fig. 2. *Caecilius analis.*

Fig. 3. *Echmepteryx costalis.*

Fig. 4. *Ectopsocus fullawayi.*

Fig. 5. Very young psocid. Natural size is 0.57 mm.

Fig. 6. *Psylloneura williamsi.*

Fig. 7. *Cyptophania hirsuta.*

PLATE IX.

Fig. 1. *Hemipsocus roseus.* Covered egg-cluster affixed to sugar cane leaf. Length of cover about 3 millimeters.

Fig. 2. *Hemipsocus roseus.* Egg-cluster exposed in its cover.

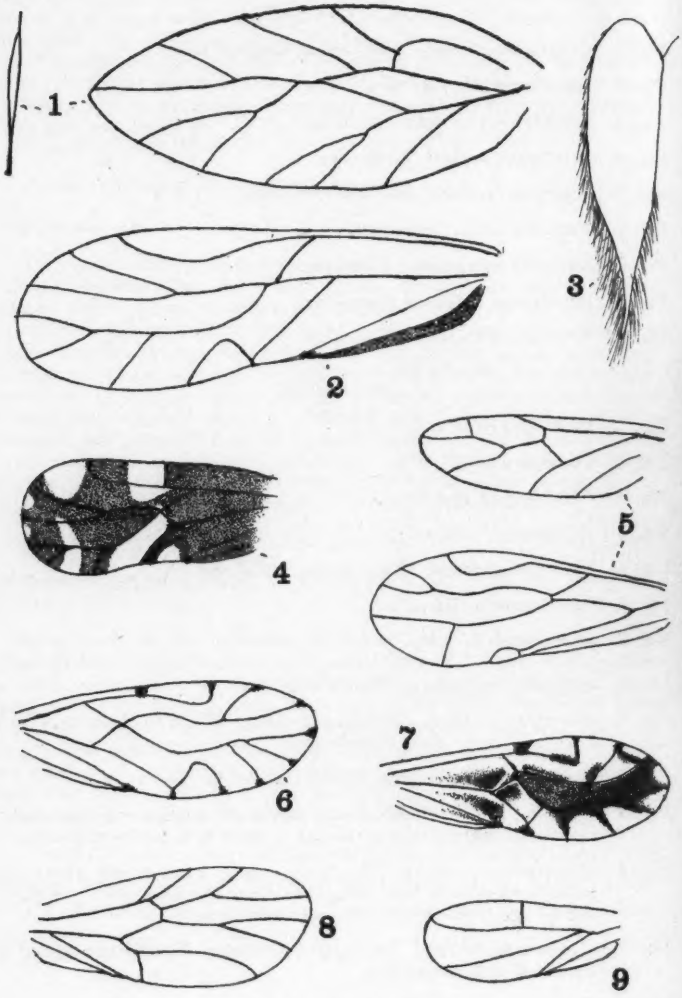
Fig. 3. *Caecilius analis.* Webbed-over cluster of hatched eggs on sugar cane leaf. Natural size of an egg is about 0.50 millimeters long.

Fig. 4. *Echmepteryx costalis.* The lower egg is hatched and shows the amniotic membrane from which the young has freed itself. Natural size of egg is about 0.40-0.50 millimeters long.

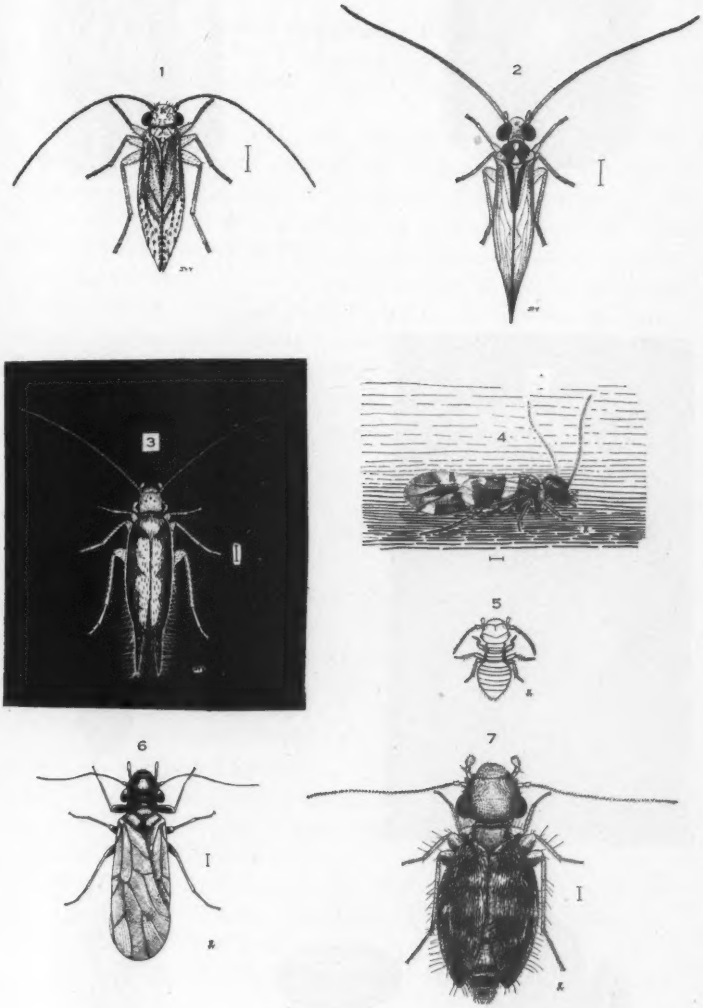
Fig. 5. *Cyptophania hirsuta.* On sugar cane tissue. Natural size of egg is about 0.45 millimeters long.

Fig. 6. *Ectopsocus fullawayi.* Natural size of egg about 0.35 millimeters long.

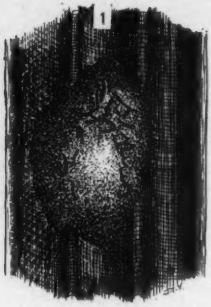
Fig. 7. *Psylloneura williamsi.* On sugar cane leaf. Natural size of egg is about 0.45 millimeters long.

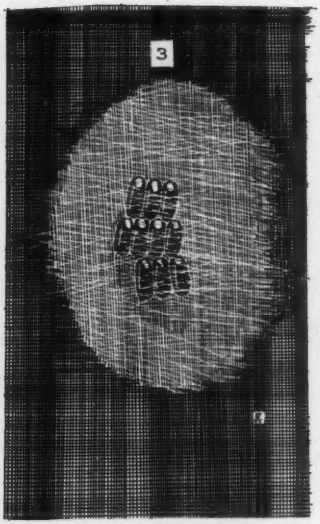


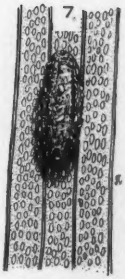
Hawaiian Psocidae.



Hawaiian Psocidae.







Eggs of Hawaiian Psocidae.

Insects of Samoa, a Review

BY E. H. BRYAN, JR.

(Presented at the meeting of October 2, 1930)

"Insects of Samoa and other Samoan terrestrial Arthropoda" is the title of a series of publications being printed by the British Museum (of Natural History), London. When complete it will consist of eight volumes, each made up of several fascicles. The series is largely on the specimens collected in Samoa by Messrs. P. A. Buxton and G. H. E. Hopkins, during the Expedition of the London School of Hygiene and Tropical Medicine to the South Pacific; together with all the Samoan material in the British Museum, and in the B. P. Bishop Museum, Honolulu. Most of the latter material was collected by O. H. Swezey in 1923 and E. H. Bryan in 1924. The fascicles completed to date are as follows:

Part I. Orthoptera and Dermaptera.
Fasc. 1. pp. 1-8, 1928. Dr. Alfredo Borelli, Dermaptera.
Fasc. 2. pp. 9-58, 51 figs. 1929. Dr. L. Chopard, Orthoptera.
Part II. Hemiptera.
Fasc. 1. pp. 1-45, 32 figs., 1927.
F. Muir, Fulgoroidea.
Prof. D. L. Crawford, Psyllidae (Chermidae).
F. Laing, Coccidae, Aphididae and Aleyrodidae.
Fasc. 2. pp. 47-80, 38 figs., 1928.
V. Lallemand, Cercopidae.
J. G. Myers, Cicadidae.
Prof. Teiso Esaki, Aquatic and Semi-aquatic Heteroptera.
Fasc. 3, pp. 81-162, 28 figs., 1930. W. E. China, Heteroptera.
Part III. Lepidoptera.
Fasc. 1. pp. 1-64, 4 pls., 1 fig., 1927.
G. H. E. Hopkins, Butterflies of Samoa and some neighboring island-groups.
Fasc. 2. pp. 65-116, 1927. Edward Meyrick, Micro-lepidoptera.
Fasc. 3. pp. 117-168, 1 pl., 2 figs, 1928. Louis B. Prout, Geometridae.

Part IV. Coleoptera.

Fasc. 1, pp. 1-66, 27 figs., 1927.

H. E. Andrewes, Carabidae.

A. Zimmermann, Dytiscidae.

M. Cameron, Staphylinidae.

A. d'Orchymont, Hydrophilidae.

G. J. Arrow, Clavicornia and Lamellicornia.

Fasc. 2, pp. 67-174, 1 pl., 39 figs., 1928.

K. G. Blair, Heteromera, Bostrychoidea, Malacodermata and Buprestidae.

R. H. Van Zwaluwenburg, Elateridae.

E. Fleutiaux, Melasidae (Eucnemidae).

Chr. Aurivillius, Cerambycidae.

R. Kleine, Brenthidae.

Karl Jordan, Anthribidae.

R. C. L. Perkins, Proterhinidae.

Fasc. 3, pp. 175-215, 19 figs., 1929.

K. G. Blair, Throscidae.

S. Maulik, Chrysomelidae.

Fasc. 4, pp. 217-248, 13 figs., 1929.

C. F. C. Beeson, Platypodidae and Scolytidae.

Part V. Hymenoptera.

Fasc. 1, pp. 1-58, 1928, 33 figs.

R. C. L. Perkins and L. Evelyn Cheesman, Apoidea, Sphecoidea and Vespoidea.

Francis X. Williams, Larridae.

Dr. F. Santschi, Formicidae.

Part VI. Diptera.

Fasc. 1, pp. 1-21, 13 figs., 1927.

L. Falcoz, Streblidae et Nycteribiidae.

G. F. Ferris, Hippoboscidae.

Fasc. 2, pp. 23-108, 24 figs., 1928.

F. W. Edwards, Nematocera.

H. F. Barnes, Cecidomyiinae.

Fasc. 3, pp. 109-175, 25 figs., 1929.

Gertrude Ricardo, Stratiomyiidae, Tabanidae and Asilidae.

P. A. Buxton, A note on the larvae of four species of Stratiomyiidae.

C. G. Lamb, Dolichopodidae.
P. A. Buxton, Sarcophagidae.
J. R. Malloch, Muscidae.

Fasc. 4, pp. 177-213, 15 figs., 1929.
J. E. Collin, Empididae and Pipunculidae.
Frank M. Hull, Syrphidae.
J. R. Malloch, Clusiidae (Heteroneuridae) and Sapromyzidae.

Fasc. 5, pp. 215-237, 6 figs., 1930.
J. R. Malloch, Ortalidae.
J. R. Malloch, Calliphoridae.

Part VII. Other orders of insects.

Fasc. 1, pp. 1-44, 1 pl., 19 figs., 1927.
Gerald F. Hill, Isoptera: Family Termitidae.
Lt.-Col. F. C. Fraser, Odonata.

Fasc. 2, pp. 45-76, 8 figs., 1928.
R. J. Tillyard, Plectoptera.
P. A. Buxton, Siphonaptera.
Richard S. Bagnall, Thysanoptera.

Fasc. 3, pp. 77-116, 2 pls., 35 figs., 1928.
J. Waterston, Mallophaga.
P. A. Buxton, Anoplura.
Martin E. Mosely, Trichoptera.
P. Esben-Petersen, Neuroptera.
George H. Carpenter, Apterygota.

Part VIII. Terrestrial Arthropoda other than insects.

Fasc. 1, pp. 1-27, 2 pls., 13 figs., 1927.
Harold G. Jackson, Isopoda Terrestria.
P. A. Buxton, Scorpionoidea.
A. Kastner, Pseudoscorpiones.
Stanley Hirst, Acarina.

Fasc. 2, pp. 29-78, 83 figs., 1929.
C. Attems, Myriopoden (Myriopoda).
Dr. Lucien Berland, Araignees (Araneida).

SUMMARY OF THE SPECIES ENUMERATED

Order and Family	Species	New Species	New Genera
Dermaptera			
Labiduridae	3		
Labiidae	5		
Chelisochidae	4		
Orthoptera			
Blattidae	22	3	1
Mantidae	1		
Phasgonuridae	10		
Gryllidae	36	15	3
Phasmidae	3		
Acrididae	7	2	
Hemiptera			
Cixiidae	9	4	
Delphacidae	19	3	
Tropiduchidae	3	2	
Meenoplidae	4	2	
Achilidae	3	1	
Derbidae	7	3	
Issidae	2		
Lophopidae	2	2	1
Ricaniidae	2		
Psyllidae	7	4	
Coccidae	37	1	
Aphididae	5		
Aleyrodidae	2	1	
Cercopidae	11	8	
Cicadidae	3	1	1
Velidae	1	1	
Gerridae	5	3	
Gelastocoridae	1		
Notonectidae	3	1	
Plataspidae	1		
Cydnidae	1		
Pentatomidae	8	1	
Coreidae	8	2	
Dysodiidae	5	4	1
Berytidae	1	1	
Lygaeidae	18	9	2
Pyrrhocoridae	2		
Tingitidae	1	1	1
Reduviidae	11	4	
Nabidae	3	1	
Cimicidae	1		
Lepidoptera			
Butterflies	28	3	(several new sub-spp.)
Pterophoridae	3		
Tortricidae	2	2	
Eucosmidae	18	10	

Order and Family	Species	New Species	New Genera
Gelechiadae	17	14	3
Agonoxenidae	1		
Cosmopterygidae	29	22	1
Carposinidae	2	1	
Orneodidae	1	1	
Carpomorphidae	2	2	
Heliodinidae	13	10	
Glyphipterygidae	7	5	1
Blastobasidae	2		
Hyponomeutidae	5	3	1
Gracilaridae	8	5	
Lyonetidae	18	12	
Tineidae	9	3	1
Geometridae	30	9	1
Coleoptera			
Carabidae	15	5	
Dytiscidae	7	2	
Staphylinidae	24	6	
Hydrophilidae	6	1	
Corylophidae	2		
Scaphidiidae	1		
Histeridae	4	1	
Nitidulidae	5	1	
Trogositidae	2		
Cucujidae	14	3	
Mycetophagidae	3		
Colydiidae	14	4	
Cryptophagidae	1	1	
Phalacridae	1		
Erotylidae	3		1
Endomychidae	1		
Coccinellidae	5	1	
Dermestidae	2		
Lucanidae	6	3	
Scarabaeidae	7		
Tenebrionidae	22	5	1
Melandryidae	1	1	1
Anthicidae	1		
Mordellidae	8	5	
Rhipiphoridae	1		
Oedemeridae	5		
Ciidae	3	3	
Lyctidae	2		
Bostrychidae	3		
Anobiidae	1		
Lycidae	4	1	1
Melyridae	2	1	
Cleridae	3		
Rhipiceridae	1		
Buprestidae	5	1	

Order and Family	Species	New Species	New Genera
Elateridae	14	6	2
Melasidae (Eucnemidae)	9	7	2
Cerambycidae	35	14	2
Brenthidae	2	2	
Anthribidae	15	10	2
Proterhinidae	1		
Throscidae	1	1	
Chrysomelidae	17	11	4
Platypodidae	2	1	
Scolytidae	34	18	
Hymenoptera			
Apidae	1		
Megachilidae	4	1	
Andrenidae	6	3	
Larridae	3	2	
Trypoxylonidae	5		
Mimesidae	1	1	
Vespidae	3		
Pompilidae	1	1	
Formicidae	39	2	
Diptera			
Streblidae	1	1	
Nycteribiidae	1	1	
Hippoboscidae	5	1	
Myceptophilidae	16	11	2
Cecidomyiidae	6	5	1
Scatopsidae	1		
Anisopodidae	1	1	
Culicidae	7		
Ceratopogonidae	16	11	
Chironomidae	14	6	
Psychodidae	6	4	1
Tipulidae	33	20	
Stratiomyiidae	7	3	
Tabanidae	1		
Asilidae	4	2	
Dolichopodidae	9	7	1
Sarcophagidae	7		
Muscidae	25	12	
Empididae	5	4	
Pipunculidae	2	1	
Syrphidae	10	1	
Clusiidae (Heteroneuridae)	2	2	1
Sapromyzidae	12	8	
Ortalidae	14	7	3
Calliphoridae	7	1	

Order and Family	Species	New Species	New Genera
Isoptera			
Termitidae	7		
Odonata			
Coenagrionidae	13	6	
Aeschnidae	3	1	
Libellulidae	12	1	
Plectoptera	1	1	
Siphonaptera	3		
Thysanoptera	8	8	
Mallophaga	10	1	
Anoplura	5		
Trichoptera	1		
Neuroptera			
Myrmeleonidae	1		
Hemerobiidae	5	3	2
Chrysopidae	11	4	1
Thysanura	4	2	
Collembola	4	1	
Terrestrial Isopods	9	1	
Scorpionoidea	2		
Pseudoscorpiones	4	2	
Acarina	1	1	
Myriopoda	10		
Araneida	81	9	

Mélasides Nouveaux

provenant des collections de la "Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu."

BY E. FLEUTIAUX

Nogent-sur-Marne, France

(Presented at the meeting of November 6, 1930, by Mr. Van Zwaluwenburg)

Galbimorpha muiri sp. nov.

11 millim. ½.—Oblong, subcylindrique; brun foncé brillant; pubescence jaune, très courte et clairsemée. Tête convexe, aplatie en avant, carénée au milieu, densément ponctuée; épistome aussi large à la base que l'espace surantennaire, caréné latéralement. Antennes ferrugineuses, se roulant vers le bout; 1er article obscur, grand, cylindrique; 2e petit subglobuleux; suivants comprimés et dentés. Pronotum aussi long que large, parallèle en arrière, arrondi en avant, sillonné au milieu, inégal, présentant des bosses irrégulières, densément ponctué; bord antérieur largement échancré au milieu. Écusson carré, plan, ponctué. Élytres parallèles, rétrécis vers le bout, sinués à l'extrémité et terminés par une pointe aiguë, densément ponctués, légèrement striés. Dessous de même couleur; pubescence semblable. Hanches postérieures parallèles, beaucoup plus larges que les épisternes métathoraciques. Pattes ferrugineux obscur.

Bornéo (F. Muir).

Diffère de *G. ferruginea* Fleutiaux par sa forme subcylindrique, sa couleur brune, son aspect brillant, les stries des élytres légères.

Maelodrus bryani sp. nov.

4 millim. ½.—Allongé, atténué; noir, élytres ferrugineux, noirs seulement sur la suture et sur les côtés; pubescence jaune pâle, très abondante à la base du pronotum et sur la partie ferrugineuse des élytres, obscure sur la partie noire latérale. Tête convexe, densément ponctuée, finement carénée au milieu; épistome plus étroit à la base que l'espace surantennaire; carène interoculaire interrompue au milieu. Antennes noires, ferrugineuses à la base, filiformes, atteignant la base du prothorax; 1er article très long, les suivants plus minces; 2e petit; 3e beaucoup plus long; 4e à peu près égal au 2e; suivants graduellement allongés. Pronotum plus long que large, parallèle en arrière, arrondi en avant, convexe, brusquement déclive à la base de chaque côté de la ligne médiane, densément ponctué. Élytres atténués, densément ponctués, faiblement striés. Dessous noir, pubescence jaune légère; ponctuation serrée. Sillons antennaires peu profonds, élargis et superficiels en arrière, non limités en dedans. Hanches postérieures très élargies en dedans, anguleuses. Dernier arceau ventral tronqué. Pattes ferrugineuses.

Fidji, Vanua Mbalavu (E. H. Bryan).

J'ai vu d'autres exemplaires au British Museum, chez lesquels les fémurs sont noirâtres.

Diffère de *M. obscurus* Fleutiaux, de Samoa, par les élytres en grande partie ferrugineux.

Maelodrus rufiventris sp. nov.

4 millim.—Étroit, atténué; noir, élytres jaunes avec une bande noire sur les côtés à partie du quart antérieur; pubescence jaune pâle à la base du pronotum et sur la partie jaune des élytres, obscure sur les côtés. Tête convexe, finement carénée au milieu; ponctuation légère; épistome à peu près aussi large à la base que l'espace surantennaire. Antennes filiformes, ferrugineuses, obscurcies vers le bout. Pronotum à peu près aussi long que large à la base, arrondi et rétréci an avant, convexe, déprimé à la base, assez densément ponctué. Élytres atténués, finement et subrugueusement ponctué. striés, ponctués. Dessous de propectus noir, assez densément ponctué. Sillons antennaires subparallèles, peu profonds, lisses, non limités en dedans. Reste du dessous jaune, un peu enfumé à l'extrémité de l'abdomen. Hanches postérieures très élargies en dedans, anguleuses, aussi larges en dehors que les épisternes métathoraciques. Dernier arceau ventral circulairement échancré. Pattes jaunes.

Fidji, Rewa (Muir).

Voisin de *M. bryani;* plus svelte; ponctuation du pronotum plus fine et moins serrée; élytres striés; dessous de l'arrière-corps jaune.

Maelodrus dorsalis sp. nov.

3 millim. ½.—Étroit, allongé; noir, élytres ferrugineux dans la première moitié et graduellement noirâtres vers le sommet; pubescence blanchâtre à la base du pronotum et des élytres, et formant au delà de la moitié, sur la suture, une grande tache longue de poils plus longs disposés transversalement. Tête convexe, densément ponctuée, finement carénée au milieu; épistome à peu près aussi large à la base que l'espace surantennaire. Antennes filiformes, atteignant la base du prothorax, ferrugineuses à la base, noirâtres à partie du 6e article; 1er long et plus gros que les autres; 2e petit; 3e long; 4e plus long que le 2e et plus court que le 3e; suivants graduellement allongés. Pronotum plus long que large, faiblement rétréci en avant, peu convexe, déprimé à la base; ponctuation assez forte et serrée. Élytres atténués, densément ponctués, non striés. Dessous noir. Sillons antennaires peu profonds, non limités en dedans. Dernier arceau ventral circulairement échancré au sommet. Fémurs noirâtres; tibias et tarses testacés pâle.

Fidji, Lami (C. E. Pemberton).

Voisin de *M. rufiventris;* forme plus étroite; pronotum plus long et assez fortement ponctué; pubescence blanche formant une

grande tache de poils plus longs disposés transversalement sur le dos des élytres; dessous noir; fémurs noirâtres.

Diffère de *M. bryani* par sa forme étroite et moins convexe; la ponctuation du pronotum plus forte, moins dense et par la grande tache pubescente des élytres.

Dromaeolus pembertoni sp. nov.

5 millim.—Oblong, atténué en arrière; noir brillant; pubescence obscure légère. Tête convexe, densément ponctuée; épistome plus étroit à la base que l'espace surantennaire; carène interoculaire interrompue au milieu. Antennes noirâtres; 2e article petit; 3e beaucoup plus long; 4e égal au 2e; 5e de même longueur; suivants plus longs. Pronotum aussi long que large, parallèle, arrondi aux angles antérieurs, convexe, déprimé à la base, sillonné au milieu en arrière; ponctuation serrée. Élytres atténués, rugueusement ponctués, légèrement striés. Dessous de même couleur; pubescence jaune. Fémurs noirâtres; tibias et tarses ferrugineux.

Nouvelle-Guinée, Middle Fly River (Pemberton).

Très voisin de *D. incertus* Fleutiaux; épistome moins rétréci à la base; carène interoculaire interrompue sur la base de l'épistome; yeux moins saillants; ponctuation du pronotum plus nette et moins grossière.

Dromaeolus nigripes sp. nov.

4 millim.—Oblong, noir brillant; pubescence obscure légère, grisâtre sur la base du pronotum et des élytres. Tête convexe, densément ponctuée; épistome très rétréci à la base, où il est beaucoup plus étroit que l'espace surantennaire; carène interoculaire entière; yeux légèrement saillants. Antennes noires, moniliformes. Pronotum aussi long que large, parallèle, arrondi aux angles antérieurs, convexe, déprimé à la base, brièvement sillonné au milieu en arrière; ponctuation forte et serrée. Élytres à peine atténués, rugueusement ponctués, striés. Dessous de même couleur. Pattes noires.

Australie, Babinda (F. Muir).

Voisin de *D. australasiae* Bonvouloir; taille moindre; pronotum brièvement sillonné au milieu à la base; élytres proportionnellement plus courts.

Fornax zwaluwenburgi sp. nov.

10 millim.—Allongé, subélliptique; brun foncé; pubescence jaune. Tête convexe, assez fortement et très densément ponctuée; épistome rétréci à la base, où il est aussi large que l'espace surantennaire; carène interoculaire interrompue au milieu. Antennes ferrugineuses, filiformes, dépassant la base du prothorax; 2e article très petit; 3e long; 4e plus court, suivants subégaux; derniers plus allongés. Pronotum aussi long que large à la base,

arrondi sur les côtés, graduellement rétréci en avant de la base au sommet, assez convexe, déprimé en arrière, densément et également ponctué. Élytres atténués à partir de la moitié; ponctuation fine et peu serrée; stries légères. Dessous de même couleur; pubescence semblable. Sillons antennaires étroits, profonds, lisses et brillants, très nettement limités et rebordés en dedans. Hanches postérieures fortement élargies en dedans, subanguleuses, très étroites en dehors. Dernier arceau ventral arrondi. Pattes ferrugineuses.

Nouvelle-Guinée, Koitaki, 1500 pieds, oct.-nov. (Pemberton).

Voisin de *F. vestitus* Fleutiaux; en diffère par la forme plus large, moins parallèle; le pronotum plus graduellement rétréci en avant.

Fornax insularis sp. nov.

3 millim. ¼.—Allongé, atténué; noir brillant, élytres bruns, noirâtres vers le bout; pubescence obscure légère. Tête convexe, assez fortement et densément ponctuée; épistome plus étroit à la base que l'espace surantennaire; carène interoculaire interrompue au milieu. Antennes ferrugineuses, filiformes, dépassant légèrement la base du prothorax; 2e article court; 3e beaucoup plus long; 4e subégal au 2e; 5e un peu plus long que le précédent; suivants graduellement allongés. Pronotum aussi long que large à la base, peu rétréci en avant, arrondi sur les côtés, peu convexe, déprimé en arrière; ponctuation assez forte, peu serrée. Élytres atténués, assez fortement ponctués, non striés. Dessous brun. Dernier arceau ventral arrondi. Fémurs bruns; tibias et tarses plus clairs.

Fidji (F. Muir).

Cette petite espèce se range dans le voisinage de *F. grouvellei* Fleutiaux; mais de forme moins elliptique; ponctuation générale plus forte; pronotum moins graduellement rétréci en avant; élytres noirs atténués en arrière.

The Pelagic Halobates

BY FRED C. HADDEN

(Presented at the meeting of February 6, 1930)

Waikiki Beach is well known for its surfing, but on January 15, 1930, at high noon, no one was surfing. The waves were high and rough, with whitecaps breaking right up to shore. A strong southwest wind of a "Kona" storm was blowing in all the drift and debris that was floating off shore.

Among all this drift were many tiny ashy gray, long-legged bugs of a most peculiar form. These small "seagoing" animals are the only insects known to be truly pelagic; that is, they live their entire life, from egg to adult and finally death, upon the briny deep. They have often been found hundreds of miles from land, and they probably never come to shore, until blown in by the strong wind of a bad storm.

Halobates sericeus Esch. is the name of this queer little bug, according to Mr. E. H. Bryan, Jr., of the Bishop Museum. It belongs to the family Hydrometridae, the members of which all live on the water of sea, lake or river.

The writer was walking along the shore at Waikiki when it was noticed that in holes in the sand and behind bunches of seaweed, there was a most peculiar commotion going on. It seemed as though there were many little gray pebbles bouncing up and down. After a closer examination, the little bouncing gray pebbles turned out to be real live insects with very long legs, which had become excited at the approach of the strange giant, and that jumping was their only means of escape from harm. After catching a few of these bouncing pebbles, it could be seen that they were real live bugs, but how differently they are constructed from most other bugs!

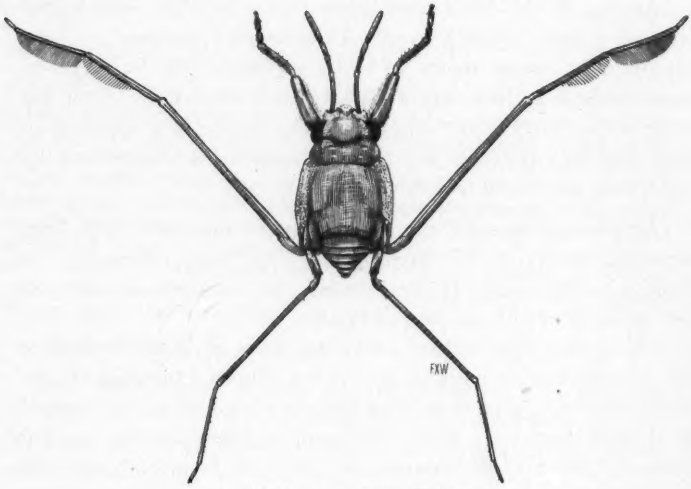
These Halobates are insects, true bugs belonging to the Order Hemiptera. In order to explain how peculiar they are, a short description must be given of them.

They have a beak or proboscis as other bugs do, and all their food is sucked up through a tube in this beak. Their food prob-

ably consists of floating decaying sea animals and plants, but small helpless sea animals are also probably attacked, and their blood sucked.

The eyes of Halobates are large for the size of the bug. They may be described as "popeyed," as their eyes are very large, protruding, and black in color.

The body of the insect is similar to a short, fat cigar, pointed at both ends. The abdomen is flat, and shaped like some of the outboard speed boats.



Halobates sericeus, X 8.

The fore legs are rather short and stout, and are used only to hold, and to carry food to the mouth. The middle and hind pair of legs are very long and very slender, two or three times the length of the body, and as fine as a human hair.* The bottom of the first joint of the foot is supplied with many extremely long and almost invisibly thin "cilia" or hairs. The only means of locomotion is their legs, as these insects have no wings. Most bugs have wings and are good fliers. Halobates more than make

* The middle pair of legs are attached to the body way back behind, and just above the hind pair of legs, so that it is rather difficult to tell which are the true hind legs.

up for their wingless condition by their swiftness or fleetness of foot, and wonderful dodging and jumping abilities.

The body is about one-eighth of an inch long, half as wide, and less in thickness. The legs are a fourth of an inch long, the fore legs are carried folded up under the head, and are never used in running.

Halobates are commonly called water striders, water skaters, skooters, etc., and how they can skoot or skate along on top of the water, usually holding their body well up in the air. The slender feet, and fine hairs on the feet support them upon the surface tension of the water, as well as our feet do on dry land, perhaps better.

Over a hundred Halobates were collected by grabbing handfuls of sand and skaters from the bottom of holes in the sand along the shore, and throwing them in a paper bag. They were then taken to the laboratory and all dropped into a white pan of water, up they popped, from the sand which had sunk to the bottom, and how they did race around! They must be the fastest thing on water. If they had not "connected" with the edge of the pan, some of them would soon have been miles at sea. Every time any one came near them they would race around more madly than ever, and again resume their funny vertical leaping. It was so easy for them to play leap-frog. They continued their mad racing around for several hours, before they finally began to quiet down. When real active they ran over the water so fast that it was impossible to follow the path of an individual skooter, as it glanced off the sides of the pan. Halobates are certainly real gymnasts and acrobats. Have you ever seen a man, or anything, jump right straight up into the air off water?

By 5:30 P. M. most of them had completely quieted down, and were all lined up, side by side, just like submarines tied up for the night, with their feet stretched out behind them.

The next morning they were all dead. Although a careful search was made along the beach to find more, none could be found. They had all crawled back to the sea, and very likely they were soon far out from shore.

Manson's Eye-Worm* Distributed by English Sparrows

BY J. F. ILLINGWORTH

(Presented at the meeting of June 5, 1930)

In this paper I wish to present some brief notes on the relation of English sparrows and the common eye-worm of chickens. These observations were made during June, 1930, in Honolulu.

Worms were first found in the eyes of domestic fowls by Dr. Manson at Amoy, China; later described by Cobbold (1879) as *Filaria mansoni*. They have since been recorded in many other parts of the world, mostly in subtropical regions. The work of Fielding** is now well known, demonstrating that the burrowing cockroach, *Pycnoscelus surinamensis* (L.) is the intermediate host of this parasitic worm.

Manson's eye-worm is a major pest of young chicks in Hawaii, particularly where they are raised on the ground in old yards. In such places, where the soil is loose and fairly dry, I have found the cockroaches down to a depth of a foot or more. The chicks are ravenous after them, and usually become thoroughly infested with the worms before they are three weeks old. I have taken as many as 205 worms from the eyes of a single chick. Recognizing these facts, successful poultry men keep their young chicks up off of the ground where they have little opportunity to feed upon the burrowing roach.

From time to time, as I have opportunity to capture young English sparrows, I examine them for parasites. I was surprised to find that they are almost invariably infested with eye-worms. In one instance, a half-grown bird was killed and dissected; the two eyes containing 152 worms; the stomach mostly fragments of insects. I was able to recognize bits of the burrowing roach together with several small worms similar to those in the eyes.

Since English sparrows are usually a nuisance, grabbing their feed from poultry yards, they probably act as an important distributor of eye-worm.

* *Oxyspirura mansoni* (Cobbold).
** Australian Jl. Exptl. Biol. & Med. Sc. 3, pp. 225-32, 1926.

Pineapple Cannery Waste and Its Insect Problems

BY J. F. ILLINGWORTH

(Presented at the meeting of December 4, 1930)

Refuse from the pineapple canneries is rich in organic matter. The solid materials are mainly skins and cores. Then, too, the wash water carries away quantities of fruit fiber, and some sugar from the juice. Hence, altogether, such waste offers an ideal breeding ground for insects.

A few years ago, when it was the practice to dump all the refuse in temporary piles near the cannery, a serious insect problem developed. Souring beetles (Nitidulidae) developed in such hordes that radical changes in factory construction became necessary. These insects were troublesome by getting into the open tins of fruit. To cope with the problem, glass partitions were put in to try to keep the beetles from entering the canning room. Finally, however, the larger factories attacked the problem at its source by installing special machinery for drying the refuse. Later it was found that this so-called waste product was rich in food value and was relished by cattle and other stock. Now, this dried material is put up in large bags and sold extensively as "Pineapple Bran."

The smaller canneries do not have sufficient refuse to make the installation of drying machinery practical. Hence the solid material must be carted to some distance, and is usually dumped into a gully or onto waste land. Even this method of disposal, however, does not fully eliminate the trouble from souring beetles in the cannery, as I shall discuss later in this paper.

I was called to one cannery where a scourge of house flies threatened to drive them out of business. These pests were present in countless numbers everywhere in the building, on the floors, on the trimming tables, and on the walls. They troubled the workers by constantly running over their hands and faces, feeding upon the sweet pineapple juice. Hence much efficiency was lost, in an everlasting effort to chase off the flies. Worse, however, was the fact that the disgusting insects were contaminating the peeled fruit on the tables, even, occasionally, drowning in the hot syrup of the cans.

This outbreak was most remarkable, since house flies, under ordinary conditions, are effectively held in check in Hawaii by natural enemies, chief among which is the predaceous, subtropical ant, *Pheidole megacephala* (Fab.).

Investigating the problem with the cannery officials, who gave me most cordial coöperation, I noted at once the reason for the outbreak. The wash water from the cannery, containing considerable fruit fiber, etc., was run off onto low, sandy ground, where it formed considerable ponds. Fermentation developed a heavy scum, which collected here and there in sort of islands, floating on the surface. In this scum was a writhing mass of maggots; when wind chanced to push a floating mass to shore, the maggots moved as an army onto the sand, where they pupated, in a few days to emerge as flies and enter the cannery.

Every effort had been made by the superintendent of the cannery to allay the nuisance, without avail. Tons of chloride of lime had been spread around the borders of the ponds, in an attempt to hinder the progress of the migrating maggots; also many barrels of crude oil were poured into the water and onto the shore, but these measures seemed to have little effect upon the rapidly increasing numbers of the pest. The maggots crawled, even through the oil, with no apparent injury, and entered the sand. Not to be outdone, I was told, they piled brush over the surface of the pond, sprayed it with crude oil, and set the whole thing on fire. Yet only the maggots on the surface were affected, and migrations of millions continued, wherever the scum islands touched the shore. At the time of my visit, the scum and muck from the sediment of the ponds were being collected by a gang of men, and buried in deep pits dug in the sand, at considerable expense. The ineffectiveness of this measure, I pointed out, for, as Dr. Stiles demonstrated in Washington, house flies are able to emerge even when buried under six feet of sand.

To abate the nuisance a barrel of arsenious acid (white arsenic) was purchased. This chemical was dissolved with caustic soda, using the formula developed at Olaa plantation for weed control: 50 pounds caustic soda, 270 pounds arsenic, and 100 gallons water. As soon as the arsenic became soluble the liquid was run very slowly into the flume carrying the waste waters

from the cannery. After a few days the effect upon the population of the ponds was very satisfactory. No maggots could be seen migrating and none could be found alive in the scum. The whole treatment required less than one-half of the barrel of arsenic.

To rid the vicinity of the adult insects we made use of Maxwell Lefroy's experiments, whereby he cleared the army camps of a scourge of flies. Bags were wet in a sweetened solution of the soluble arsenic and hung up where the flies could settle on them. Inside the cannery it was not safe to use poisons, so traps were constructed, of the well-known cone type. These were very effective. Once new hordes from the ponds ceased, the situation quickly improved, and the buildings were practically free from the pest.

The souring beetles, referred to above, are a more troublesome pest to combat. I have long considered them a major problem in the field, but it is the cannery phases that I shall discuss here. Even our best equipped institutions suffer, at times, from the entrance of hordes of these insects.

The beetles are strongly attracted to overripe fruit. In one instance I was called for consultation, because the trimmers found so many of the larval beetles coming onto the tables with the peeled fruit. This was during the winter season when pickings were far apart, and I discovered, by a study of the problems in the field, that now and then an overripe, soft fruit was placed in the lug boxes with the perfect specimens. During transit from the field to the cannery these soft fruits became more or less crushed, and the beetle larvae crawled all over the adjoining good fruits. In this way some of them were carried along onto the tables. The management was paying the girls five cents each for throwing out perfect fruits on which beetle larvae were found. From the pile discarded I estimated that the loss was considerable. Elimination and destruction of the overripe, infested fruits in the field, instead of mixing them with the good fruit for the cannery was recommended.

In the cannery the beetles show a very strong light reaction. They are easily attracted away from the tables, cookers, etc., to windows with bright sunlight. I found that fruit shipped from

the field in closed box cars had clouds of beetles emerge when the doors were opened at the cannery platform. In contrast with this situation, few beetles were noticeable about the boxes of fruit on open cars. During transit most of the pests fly and are blown away from the open crates. Hence, I concluded, the situation would be considerably relieved by openings in the box cars—the beetles flying to the light are blown away.

The wind relation is another consideration in combating these insects in the cannery. Factories with receiving platforms to the windward are considerably troubled with the pest, while just the reverse is true where the fruit is received on the leeward side. In this latter case, the beetles when disturbed take wing and are wafted away from the cannery by the prevailing wind. This is particularly noticeable in one of the canneries favorably situated in Honolulu.

That the souring beetles travel far on the wing is another factor that must be taken into consideration in dumping cannery waste. They are strong fliers with the wind, as I found in one instance. In this case it was difficult to account for the great numbers of beetles entering a cannery with no breeding material in the immediate vicinity. I finally traced the source to a dump of pineapple refuse from another cannery more than a mile to the windward. Hence, we may conclude that dumping the refuse is a poor policy under any consideration, for the hordes of insects produced soon spread to fields of growing plants, curtailing production, and eventually, as we have seen, many travel back to the cannery with the ripe fruit. Therefore it would appear that best results for the industry can only be secured by the strictest sanitary field practice. It is there that the beetles breed, and clean culture will go far toward removing the trouble from these insects in the cannery.

Notes on Some Bugs Associated with Pineapples in Hawaii

BY J. F. ILLINGWORTH

(Presented at the meeting of Jan. 2, 1930)

During our study of yellow spot disease of pineapples, various Hemiptera came in for investigation. I wish here to record briefly notes on three species of Heteroptera.

Leucopoecila albofasciata Reuter, is a small mirid, about 2 mm. in length. It is common in weedy pineapple fields, breeding on purslane, nightshade, etc. The eggs, typical for the family, are long-oval shaped with a circular cap, and are imbedded at an angle into the tissues of both leaves and stem of these plants. When caged with seedling pineapple plants, the bugs oviposited in the tender white tissue of the leaves, in the axillary region. The injury was not serious, however; the water-soaked appearance of the plant tissue surrounding the eggs usually disappeared soon after hatching of the insects.

This species has evidently been in the Islands for some time. The first specimen captured is in the collection of the Experiment Station of the Hawaiian Sugar Planters' Association, taken by Terry on Kauai, October 8, 1909.

This species was described in 1907 from specimens taken by Mr. E. P. Van Duzee in Jamaica. It has subsequently been reported from Pennsylvania, Florida, and California. Mr. Van Duzee, who determined my material, says: "It is a common alfalfa bug in Southern California, and must have been introduced to the Islands."

Pycnoderes 4-*maculatus* Guerin, was also determined by Mr. Van Duzee, who states that it is a species from the southern United States, especially the southeast. He says it was described from Cuba and has been recorded from Mexico. We captured the first specimens in the Islands on purslane among old pineapple plants, Dec. 11, 1929. It is a mirid about 3 mm. in length, mottled gray and white, legs yellowish white, with distal two-fifths of hind femora black. The specific name refers to four conspicuous white spots located on the back, two on each side near the edge. Essig[1] calls this the squash capsid, *Pycnoderes quadrimaculatus* Guerin. He says it is a pest of cucurbs and is particularly injurious to cucumbers, cassaba, canteloupes, muskmelon, squash, and watermelon, but also feeds on beans, lettuce, other garden vegetables, and weeds. To date it has not been reported as a pest in Hawaii.

Triphleps persequens White, is a fairly old resident in Hawaii. It belongs to the family Anthocoridae, and is a valuable predator upon aphids, thrips, and other minute insect pests. Search for the

[1] Insects of W. N. Amer. p. 363 (1926).

eggs of this species resulted in the discovery that they were also imbedded in the tissue of the leaves of purslane. The eggs look quite like those of the mirid bugs. This species also inserted its eggs into pineapple leaves when caged upon these plants, but no serious harm resulted. While investigating oviposition, I found a paper by H. Garman and H. H. Jewett,[2] dealing with the biology of *Triphleps insidiosus,* of considerable assistance. This paper has a splendid illustration, showing the eggs inserted into corn silk. During our study of thrips, which transmit the disease yellow spot of pineapples, we found that *Triphleps persequens* quickly congregated whenever thrips became abundant, resulting in the rapid reduction of the pest.

[2] Ky. Agr. Exp. Sta. Bul. 187, pp. 587-88, (Dec. 1914).

New and Little-Known Fulgoroidea from South America

BY F. MUIR

(Presented at the meeting of December 4, 1930, by O. H. Swezey)

The finding of a typical representative of Lophopidae in South America and the placing of a less typical species into that family is of interest as this is the first recognition of the family from either North or South America.

It is nearly impossible to work on the genus Dictyophora at present, as it contains a miscellaneous collection of forms; a few have been segregated into other genera but others equally distinct from the type remain within the genus. The best characters appear to be in the head and until these have been more adequately described and figured it is difficult to work upon the genus except on specimens one has access to. The difficulty, and also the interest, lies in the fact that starting from any one type there are gradations of forms in several directions. This will be recognized in the genus Taosa Distant dealt with below.

Dictyophoridae

Taosa Distant

Distant erected this genus in 1906 with *Flata suturalis* Germ. as the type. This species had been placed by Stål into Nersia, by Walker into Cladodiptera (as *muliebris*) and by Berg into Dictyophora. The chief characteristic of this genus is the short head, the vertex not projecting in front of the eyes, or only slightly, with a transverse carina dividing the base of the frons from the vertex. An examination of a series of species shows that the position of this transverse carina differs in nearly every species, in some being straight and not projecting in front of eyes, in others being curved and projecting in front of eyes. To draw a line between these extremes would be difficult and arbitrary. There is one character which binds them together which I think should be considered as the generic character, namely, a small angular area at the point where the transverse carina joins the lateral margins.

Apart from this some of the species are difficult to separate from some of the short-headed Dictyophora.

Many species of Dictyophora have been described without adequate description or figures of the structure of the head, and so it is impossible to identify them with certainty. It is possible that some of the following species described as new have already been described in Dictyophora, but I must leave it for those having the types to make the comparison.

Melichar gives *Flata vitrata* Fabr. as the genotype, but makes no statement why he does so.

1. Taosa viridis sp. n. Fig. 1.

Male: Length 6 mm.; tegmen 8 mm.

Vertex short, broad, width 2.7 the length, apex and base equally curved; base of frons as seen from above swollen in middle with indications of the medio-lateral carinae. Length of frons 1.5 the width, carinae distinct except at extreme base. Hind basitarsus long, narrow, apex not expanded, truncate, with seven or eight minute spines; second tarsus narrow, not expanded at apex, with seven or eight minute spines at the truncate apex.

Green; two black, shiny marks at base of frons over the medio-lateral carinae; a shiny black dot on mesopleura near base of tegmen; the longitudinal ridges of front and middle legs brown, forming fine lines, the tarsi fuscous. Genital styles and anal segment dark brown. Tegmina hyaline, veins greenish brown, darker brown in membrane; stigma four-celled, dark brown. Wings hyaline with brown veins.

One male from Brazil, Amazon, during trip between Manaos and Teffé (Ega) and back again (A. Roman, April, 1915). Type in Stockholm Museum.

2. Taosa bimaculifrons sp. n. Figs. 2, 3.

Male: Length 7 mm.; tegmen 10 mm.

Transverse carina on vertex about level with the anterior margins of the eyes, slightly curved, width 1.8 the length; posterior margin slightly concave, the base of the frons as seen from above swollen in the middle. Frons widest on apical half where the sides are round, length 1.4 times the width; median and medio-lateral carinae distinct, obscure at base, the suture between clypeus and frons very slightly curved. Apex of hind tibia expanded, with eight large spines; basitarsus fairly broad, apex not expanded, with seven small, even spines; second tarsus fairly large, apex not expanded much, with seven even small spines. Male genitalia figured.

Yellow or light reddish brown; two black, shiny marks at base of frons covering the bases of the medio-lateral carinae; three dark marks on metapleura; hind coxae dark with the meracanthus light, hind trochanter fuscous. The tegmina hyaline, veins brown, those in membrane darker than in corium; stigma light brown, in one tegmen two-celled, in the other three-

celled, commissure of clavus dark; apical margin slightly fuscous extending into cells at apex of Sc and M 1 and 2. Wings clear hyaline, veins brown, no marks.

Female similar to the male in build; the sixth and seventh abdominal sternites dark brown, also the ninth tergite, the dorsal valvulae and the apex of anal segment; the ridges of front and middle legs are brown, which is hardly perceptible in the male.

One male, Brazil, Belem (F. X. Williams, VI, 1924) and one female Ecuador, Tena (F. X. Williams, IV, 1923). Type in H. S. P. A. Experiment Station, Honolulu.

3. Taosa lineatifrons sp. n. **Fig. 4.**

Female: Length 7.2 mm.; tegmen 9 mm.

The transverse carina curved considerably more than the hind margin; at the sides considerably shorter than in the middle, width nearly twice the length; the base of frons in dorsal view evenly rounded, not swollen in middle; length of frons 1.2 times the width, carinae obscure. Apex of hind tibia somewhat expanded, seven or eight large spines; first and second tarsi comparatively short, expanded at apex with the apex V-shape, a large spine at each corner and a double row of thin, long spines, backed by the usual flattened hairs.

Head light brown, two wide, longitudinal dark brown marks down frons covering the medio-lateral carinae, turning out towards the apex; clypeus marked with brown, two small dark spots in vertex. Pronotum fuscous brown, light in the middle and with lighter mottling; mesonotum dark brown, lighter down the middle, with light branch-like markings on the darker portion; tegulae light. Legs and pleura light with darker markings; front legs with obscure fuscous bands; middle and hind femora with obscure longitudinal marks. Abdomen dark brown, dorsally with three fine broken lines down the middle; pleura light; hind margin of sternites narrowly light. Tegmina hyaline, veins brown, light in corium, dark in membrane; stigma three-celled, dark brown; claval commissure dark brown extending slightly into cell; a fuscous mark in membrane over radial and median apical cells extending half way across membrane along M 3, 4 and Cu 1. Wings hyaline, veins dark brown, a fuscous mark at apex of Cu.

One female from Brazil, Villa Americana (F. X. Williams, II, 1924). Type in H. S. P. A. Experiment Station, Honolulu.

4. Taosa terminalis (Germ.).

One female from Costa Rica, Matina; one male from British Guiana, Blairmont (F. X. Williams, X, 1923) and one female from British Guiana, New Amsterdam (F. X. Williams, VIII, 1923). These specimens agree with *Cladodiptera virilis* Walk. which has been synonomized with *terminalis* Germ., but they do not entirely agree with Melichar's description of the latter. The

transverse carina at apex of vertex is about level with the anterior margin of eyes, the width of vertex 1.7 the length, the base of frons visible in dorsal view is rounded and smooth, not swollen in middle as we find in *bimaculifrons*.

5. Taosa pseudoscriptiventris sp. n.

Female: Length 8 mm.; tegmen 9.7 mm.

Width of vertex nearly twice the length; apex in line with the anterior margin of the eyes, nearly straight; sides of the triangular areas subequal in length; carinae of frons obscure.

Light brown, the two triangles black and a small black mark in the middle of each half of vertex. The medio-lateral carinae of frons dark brown, widest at base and gradually thinning out towards apex; median carina also dark; clypeus dark brown on each side of median carina. Pronotum light with small darker marks; mesonotum and metanotum dark brown with lighter marks. Abdomen dark brown with lighter marks; in the middle of the tergites these marks take on the shape of a wide inverted V, the apex on the posterior portion of one segment and the arms reaching to the posterior margin of the next; on the sides there are small oblong marks. On the sternites the hind margins are narrowly margined with light which is in turn margined with a narrow dark line. Tegmina hyaline with brown veins; stigma brown, the dark color extending over the nodal line slightly into the cells. Some irregular brownish marks in the apical and subapical cells of M. Wings hyaline with brown veins, a brown mark on margin at apex of Cu.

One female from Brazil, Parana (E. D. Jones, 1905). This comes next to *Cladodiptera scriptiventris* Walker which is also a Taosa. Type in British Museum.

6. Taosa scriptiventris (Walker). New combination.

Cladodiptera scriptiventris Walker, 1858, Cat. Hom. Supp. p. 76.

Nersia scriptiventris (Walker) Stål, 1862, Op. Vet. Ak. p. 487.

Cladypha scriptiventris (Walker) Melichar, 1912, Monog. Dictyophorinen.

This species has all the characters of Taosa. It has no cross vein in the clavus.

7. Taosa holmgreni sp. n. Fig. 5.

Male: Length 5.7 mm.; tegmen 8.2 mm.

Vertex small, wider than long (1 to .65), the portion of the frons visible from above nearly equal to the length of vertex; the width of vertex subequal to the width of an eye; the transverse carina not quite level with the anterior margin of eyes. The medio-frontal carina distinct, medio-laterals indistinct. First and second hind tarsi not much expanded at apex, each with an even row of small spines at apex.

Head light brown or stramineous; two small brown marks on vertex, a shiny brown mark down the middle of frons divided into two by the lighter median carina, the dark mark becoming narrower apically; clypeus darker at apex and sides and on each side of median carina. Pronotum light, carinae lighter, a dark mark on each side behind antennae. Mesonotum dark brown, light in the middle in the shape of a cross, and along the hind margin; pleurites mostly dark edged with light; femora brown with longitudinal light lines; front and middle tibiae and tarsi darker brown, hind tibiae and tarsi lighter; abdomen dark brown, one median mark reaching to apex and two medio-laterals reaching half way on dorsum light, pleura light. The sternites light in middle. Tegmina hyaline, shiny, commissure dark brown, extending into the hind claval cell, a dark brown mark from apex of clavus to apex of membrane extending over most of the apical cells; veins brown. Wings hyaline, shiny, brown veins; a fuscous mark on margin at the apex of Cu.

Three males from Camory on frontier between Peru and Bolivia, east side of Andes (N. Holmgren). Type in Stockholm Museum.

8. Taosa viridifrons (Walker). Fig. 6.

Cladodiptera viridifrons Walker, 1858, Ins. Saund. Hom. p. 41.

Cladypha viridifrons (Walker) Melichar, 1912, Mon. Dictyophorinen, p. 11.

Taosa vitrata (Fabr.) = *viridifrons* Walker, Melichar 1912, op. cit. p. 153.

I have one specimen from Camory (Holmgren) very closely allied to *T. holmgreni* but with only a dark band across the base of the frons. This specimen agrees with Walker's type of *viridifrons*.

Melichar appears to have placed Walker's species into two places in his Monograph, as the above references show. In his table, defining the three species he recognized, *vitata* is stated to have "Flügel ohne Randfleck," but *viridifrons* has such a mark similar to the one in *holmgreni*. These two species are more closely allied to *T. suturalis* (Germ.) than to *T. vitata* (Fabr.) according to Melichar's table.

9. Taosa sororcula (Berg). New combination.

Dictyophora sororcula Berg, 1879, Hom. Argent. p. 219, 265. This species belongs to this genus.

10. Taosa rufa sp. n. Fig. 7.

Female: Length 6.8 mm.; tegmen 8.4 mm.
Width of vertex 1.25 times the length; only a small portion of frons

visible from above. Frons longer than wide, length 1.4 times the width on apical half, base narrower than apex, the three carinae distinct, the bases of the medio-laterals swollen slightly.

Light reddish brown; the swollen portion of the base of the medio-lateral frontal carinae black; a small round black spot on the mesepimeron; dark fuscous over the posterior angle of mesonotum and postscutellum, a broad, dark fuscous mark down the middle of the abdominal dorsum, the anal style and apex of anal segment fuscous. Tegmina hyaline, the clavus and base of corium slightly reddish brown, the outer claval cell the darkest; veins reddish brown, the commissure and second claval vein the darkest; wings hyaline, slightly tinged with yellowish, veins light brown.

One female from Brazil, Parana (E. D. Jones). Type in British Museum.

11. Taosa herbida (Walker). New combination. Fig. 8.

Dichoptera herbida Walker, 1851, Cat. Hom. II, p. 306.

Four specimens from: Costa Rica, Matina; Brazil, Dumont St. Paulo and Piracicaba; Ecuador, Tena. The female specimen from Costa Rica is larger than the others and the female from Tena is reddish—the base of each of the medio-lateral carinae of frons is black.

12. Taosa paraherbida sp. n. Fig. 9.

Male: Length 10 mm.; tegmen 11 mm.

Length of vertex subequal to width at base, about one-half projecting in front of eyes, anterior margin strongly curved. The triangular area on each side is narrowly open. The three carinae on frons distinct. Genital styles longer than wide, ventral margin entire, nearly straight, dorsal margin slightly angular on basal half, the style gradually narrowing to the obtusely pointed apex, a small curved spine on dorsal margin near base; styles slightly longer than anal segment.

Green, slightly tinged with reddish brown. Tegmina and wings clear hyaline with green veins.

Female very slightly larger.

One male and two females from British Guiana, Blairmont (F. X. Williams, IX, X, 1923). Type in H. S. P. A. Experiment Station, Honolulu.

This differs from *T. herbida* in the shape of the vertex and in the absence of the two small black marks at base of frons.

Brachytaosa gen. nov.

The head and thorax of this genus are similar to those of Taosa but the carinae are obscure; the tegmina are very different, being short, diagonally truncate at apex, leathery, and broken up into innumerable small, irreg-

ular cells by irregular cross veins, the only portion free from these cells being the extreme base of corium.

The vertex separated from the frons by a transverse carina with a small triangular area where it meets the lateral carinae; an obscure median longitudinal carina; the carinae very obscure. Frons longer than wide, lateral margins slightly sinuate; three longitudinal carinae, the intermediates curving and meeting at the base; all very obscure. Clypeus tricarinate, the base projecting, rounding into apex of frons (clypeal suture arcuate). Pronotum short, the carinae very obscure; mesonotum short, obscurely tricarinate. Legs moderately long, simple, front tibiae only slightly longer than the femora. Hind tibiae with five to six spines on side, apex slightly expanded with a simple row of eight moderately large spines; hind basitarsus long, expanded at apex with an apical row of fifteen or sixteen minute spines, the outermost pair the largest, with a row of white flattened small hairs arising behind them; second tarsus fairly large, expanded apically with a similar row of spines and hairs to the basitarsus. Tegmina extending only slightly beyond the abdomen; apex obliquely truncate; claval veins forking about middle of clavus, entering commissure slightly before apex. Main veins obscured on account of the network of cross veins; Sc + R not forking or not before node; M forking a little before the apex of clavus, Cu somewhat basad of that, M arising from basal cell not joining Sc + R. Tegulae present.

1. Brachytaosa venturii sp. n. Fig. 10.

Female: Length 6.5 mm.; tegmen 6.5 mm.

In dorsal view a considerable portion of the base of the frons is visible, making the transverse carinae about the middle. Light brown; a dark brown mark at base of frons divided down the middle by the light median carina; the labium, apex and sides of clypeus, genae and the anterior lateral portion of pronotum (where it touches genae and eyes) dark brown; legs dark brown; femora with thin, longitudinal light lines; front and middle tibiae with a light band in the middle. Ventral surface of abdomen with small, dark brown spots. Tegmina leathery, brown with the veins yellow or light brown; much lighter in color at the base of clavus where the cross veins are missing, at node and on an indefinite mark from apex of clavus to apical angle. Wings hyaline, brown along the apical margin and distal portion of costal margin; veins light brown, showing up light in the brown portion.

Two female specimens from Argentina, Gob. Formosa (S. Venturi, I. 1898). Type in British Museum.

Tropiduchidae

Alcestis Stål

1. Alcestis costalis sp. n. Fig. 11.

Male: Length 5 mm.; tegmen 8 mm.

Vertex considerably broader than long, apex slightly rounded, base roundly emarginate, margins not thickened, median longitudinal carina very

obscure or missing; frons longer than wide, the median carina distinct, the apical curved portion of the anchor small; longitudinal median carina of clypeus obscure, no lateral carinae. The hind margin of the pronotum subangularly emarginate, the median carina very obscure. The three carinae of mesonotum distinct.

Tegmina broad, costal margin and apical margin round; the costa arising from the base, curving and recurving and reaching the costal margin considerably before the middle, the costal area fairly broad, short, with transverse veins (8). The Sc and R joined into a common stalk for a short distance, the Sc giving off four branches (the basal two bifurcate) which reach the costal margin; four Rs are on apical margin; five Ms, 1, 2, 3, 3a and 4. Cu 1 with three branches, Cu la with two. Clavus reaching beyond middle of tegmen; claval vein entering apex of clavus. A number of irregular cross veins.

Light stramineous; tegmina and wings hyaline, slightly yellowish, veins light yellow. All the cross veins in tegmina fuscous.

Pygofer laterally flattened, lateral margins slightly rounded. Anal segment longer than wide, widest slightly distad of anus, which is slightly before middle; slightly narrowed to apex which is roundly emarginate. The inner and apical margin of the genital styles rounded, the outer apical angle produced, a small curved spine on the outer margin near the base.

Hab. Brazil, Rio Autaz (A. Roman, August); one male specimen somewhat damaged.

2. Alcestis romani sp. n. Figs. 12, 13.

Male: Length 6 mm; tegmen 7 mm.

This species differs from *costalis* in having the median frontal carina more obscure, the Sc with only 5 veins entering costal margin and the R with three. In color the body is more reddish and the fewer cross veins in the tegmina very slightly fuscous.

The pygofer compressed laterally, the lateral margins slightly rounded. The anal segment long and narrow, apex narrow and subtruncate, anus about the middle. The genital styles long, narrow, shape as figured.

Hab. Brazil, Rio Autaz (A. Roman, September); one male specimen.

LOPHOPIDAE

Carrionia gen. nov.

This genus is near Jivatma; it differs in having no lateral carinae on the clypeus and its larger size. Its chief interest lies in the fact that it is the first species of Lophopidae to be reported from either North or South America. That it should be so closely related to a Malayan genus is difficult to understand. The costal area is small and does not reach so far as the apex of clavus; Sc + R forking near base, M and Cu forking about level, slightly distad of the middle of clavus; cross veins irregular, no nodal line or apical line.

1. Carrionia flavicollis sp. n.

Female: Length 11 mm.; tegmen 15 mm.

Length of vertex in middle 1.25 the width at base, slightly narrower at apex where it is divided from frons by an angular carina; a median carina which does not quite reach the apex. The length of frons subequal to width at widest portion, base narrowest, gradually widening to level with antennae though each side is angularly produced; the carinae on lateral margins not continued onto clypeus; median and medio-lateral carinae distinct, not quite reaching apex. Clypeus with a median carina but no laterals. Antennae small, second segment about as long as wide. Ocelli absent. Pronotum straight on the hind margin, tricarinate, the laterals converging together anteriorly, not reaching the hind margin; no shoulder carinae.

Mesonotum short, tricarinate. First and second tibiae and femora thin and expanded; front femora narrowest at base, gradually widening to the truncate apex; tibiae straight on inner margins, arcuate on outer; second legs similar to first but not quite so wide. Hind tibiae with three spines on the sides, apex with about eight apical spines, the outer two large, the rest small and irregular; hind basitarsus long, subparallel-sided, the apex not expanded, the apical spines irregular, forming a small pad; second tarsus small, without spines. The anal segment long, slightly curved, the apex expanded into a large bilobed plate secreting red powdery wax; the dorsal valvulae forming two semicircular plates, the inner and ventral valvulae small.

Head shiny black, the genae, beneath the eyes and the base of clypeus green; pronotum in the middle between the tegulae, shiny black on lateral portion; mesonotum dark brown; pleura, legs and abdomen (except genitalia) dark brown. Tegmina uniformly dark brown (the apices are broken); wings dark fuscous brown.

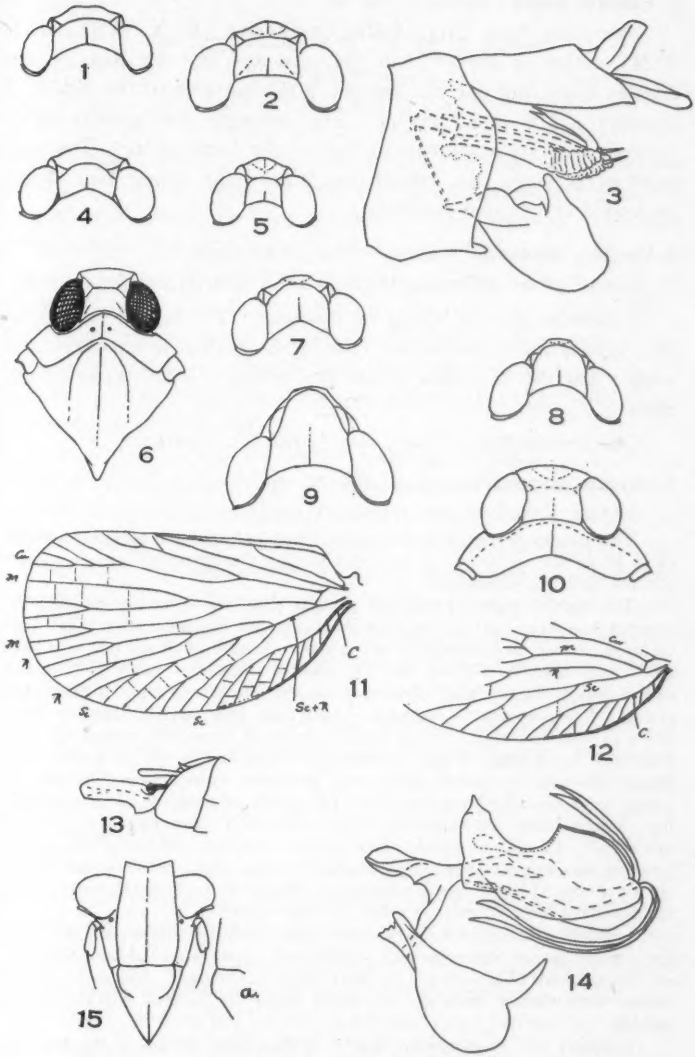
One female, Ecuador, Prov. Loja, Zamora (Prof. C. Carrion, July, 1925). Type in British Museum.

Hesticus Walker

This genus was placed by Melichar as doubtfully belonging to the Dictyophoridae. The male genitalia show that it does not belong to that family but to one of the Flatid-Ricaniid group of families. The hind tibiae have three spines on the side and nine or ten small ones at the apex, slightly irregular; the basitarsus fairly long and narrow with six small spines at apex and a couple near the apex; the second tarsus small, narrowly rounded at apex and without any spines. As there is no costal area and the frons is narrow and not angular, this genus must come into the Lophopidae. When we consider that this family contains some fairly diverse forms this should not appear strange. This makes the second genus of this family to be reported from South America.

EXPLANATION OF FIGURES, PLATE X

1. *Taosa viridis*—dorsal view of head.
2. *Taosa bimaculifrons*—dorsal view of head.
3. *Taosa bimaculifrons*—lateral view of male genitalia, the membrane not fully expanded.
4. *Taosa lineatifrons*—dorsal view of head.
5. *Taosa holmgreni*—dorsal view of head.
6. *Taosa viridifrons*—dorsal view of head and thorax.
7. *Taosa rufa*—dorsal view of head.
8. *Taosa herbida*—dorsal view of head.
9. *Taosa paraherbida*—dorsal view of head.
10. *Brachytaosa venturii*—dorsal view of head and pronotum.
11. *Alcestis costalis*—right tegmen.
12. *Alcestis romani*—right tegmen, costal portion.
13. *Alcestis romani*—lateral view of male genitalia.
14. *Hesticus pictus*—lateral view of aedeagus and genital style.
15. *Hesticus sanguinifrons*—front view of head; (a) outline of base of clypeus.



South American Fulgoroidea.

1. Hesticus pictus (Walker). **Fig. 14**

One male from City of Rio de Janeiro (F. X. Williams, I, 1924). This is darker than the type and has the base of the clypeus black, but one can see red at the margins of the black. I consider it the same species. The aedeagus and genital styles figured; the type conforms to that of the Lophopidae. The anal segment is large, the lateral margins of the apical half being expanded and turned ventrad.

2. Hesticus rufimanus (Walker). **New combination.**

Cladodiptera rufimanus Walker, 1858, Cat. Hom. Suppl. p. 77.

I consider this to belong to Hesticus. The lateral carinae of the clypeus are considerably raised; the vertex is narrower and longer and the V carina across the vertex a little nearer to the apex.

One female from Brazil, Rio Autaz (A. Roman).

3. Hesticus sanguinifrons sp. n. **Fig. 15, 15a.**

Female: Length 8 mm.; tegmen 11 mm.

This species is typical of the genus; the front legs are not quite so wide as in *H. pictus*. It is near to *H. rufimanus* but the lateral carinae of clypeus are not quite so prominent.

The width of vertex slightly greater than the length in middle; the angular transverse carina near apex; the lateral margins subparallel, with elevated carinae, base angularly emarginate. Length of frons 1.5 the width; the lateral margins slightly sinuate, slightly widest on apical half, a fine carina down the middle; clypeus with the lateral carinae elevated and curved; first segment of antennae wider than long, second segment about twice as long as broad. Front femora flattened, expanded, widest at apex, gradually narrowing to base, length 3.5 times the width at apex, front tibiae flattened, expanded, inner edge straight, outer curved, length 4.4 times the width, a keel running down the middle of anterior surface; middle legs flattened but not expanded; hind tibiae with three spines on side on apical half, the first in middle, apex slightly widened with about nine spines forming an irregular row; hind basitarsus long, thin, six or seven minute spines at the truncate apex forming a regular row; second tarsus small, apex pointed or narrowly rounded, without spines.

Yellow; a blood red mark down the middle of frons and clypeus; the median carina of mesonotum slightly red; front legs reddish; the apex of femora and tibiae brownish; hind femora fuscous. Abdomen reddish brown with darker mottling, especially along the lateral portion of the dorsum.

Tegmina and wings clear hyaline with brown veins; in the tegmina these are darkest in the membrane; stigma reddish brown; a small fuscous mark on apical margin at apex of Rs.

One female from Tena, Ecuador (F. X. Williams, III, 1923).

An Egg Parasite of Thrips in Hawaii

BY C. E. PEMBERTON

(Presented at the meeting of June 5, 1930)

During January, 1920, the writer collected some minute Trichogrammatid adults on leaves of an undetermined tree in a forest near Mountain View, Hawaii. These were in association with a small quantity of an undetermined thrips and were suspected of being probable egg-parasites of this thrips because of their behavior. These were later described by Timberlake [1] as *Megaphragma mymaripenne* Timberlake; representing a new species and genus. It was next seen by Swezey [2] on March 29, 1927, when he collected two specimens, associated with thrips on a croton leaf in Honolulu.

On May 10, 1930, the writer noted this parasite on leaves of *Brassaia actinophylla* F. von Mueller and croton, *Codiaeum variegatum* Blume, in Honolulu in association with small colonies of *Heliothrips haemorrhoidalis* Bouché. Minute swellings on the leaves where the thrips were clustered were found upon dissection to contain the thrips eggs; a fair percentage of which were discovered to contain mature Megaphragma pupae. Owing to the small size of the thrips egg and its fragile nature, no fresh eggs were removed successfully to reveal the living Megaphragma larva. The upper end of the egg, however, could be broken off and the mature Megaphragma pupa examined intact within the thrips egg shell and removed to a slide in a slightly damaged condition; but sufficiently perfect to permit positive conclusions and identification.

Some of these bits of leaf containing thrips eggs were saved in vials and seventeen Megaphragma adults emerged therefrom. The parasite cuts a neat, imperfectly circular exit-hole at the point of emergence. This measures from .08 to .09 mm. in diameter. Such emergence holes can be readily seen scattered over the surface of the leaf on top of the small swellings on the leaf where thrips eggs have been inserted. The empty thrips egg shells can be readily found beneath these exit holes.

The abundance of the parasite emergence holes on leaves where thrips have been, the comparative ease with which the parasites were obtained where thrips were still present on leaves and the general unimportance of *Heliothrips haemorrhoidalis* as a pest in Honolulu, suggests that *Megaphragma mymaripenne* is an important factor in its control. Mr. Timberlake assumes it to be a probable immigrant to Hawaii.

Heliothrips haemorrhoidalis, presumably a native of tropical America, is well known in Europe and the United States as a greenhouse pest of many plants and as a pest of various ornamentals, especially crotons, in tropical and semitropical regions [3].

A related thrips, *Heliothrips fasciatus* Pergande, is parasitized in the prepupal stage in California.* This parasite has also been reared from *Thrips tabaci* Lindeman and *Euthrips tritici* Fitch in California, but no egg parasites are recorded to our knowledge.

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(3) Russell, H. M.—The Greenhouse Thrips. U. S. D. A., Bur. Ent., Bull. 64, Pt. 6, August, 1909.

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Miscellaneous Notes

BY O. H. SWEZEY

(Presented at the meeting of June 5, 1930)

Coptotermes formosanus Shirakai.

In the large collection of Hawaiian insects sent to the Bishop Museum in 1929 by Dr. R. C. L. Perkins are 4 soldiers, 1 winged and 1 dealated individual of this termite labelled: "Honolulu 1907 or earlier." This would make this the earliest record of this termite in Honolulu. Other early records are: "In piling of Pier 7, Honolulu, June, 1912 (Ehrhorn)"; "In the Chapel at Kamehameha Schools, Dec. 5, 1913 (Swezey)". It was somewhat later than the last date that the identity of the species was ascertained.

Agromyza virens Loew.

This new immigrant fly was recently reared from maggots in the stems of sunflower. Sunflower plants were being grown in flats for experimental purposes at the Experiment Station, H. S. P. A., and nearly every plant was found to have one or more maggots in the stem. The puparia were found in some of them, and from these, flies issued in a few days (April 22, 1930).

Anomalochrysa biseriata Perkins.

Two specimens of this hemerobiid were reared from eggs found on a leaf of monkeypod tree in the Oahu College grounds. There were 5 white eggs standing on end in a cluster. The young that hatched were fed on *Aphis medicaginis* Koch. They were green when mature. At no time did they cover themselves with the remains of the insects on which they had fed. The exact time was not taken, but larvae became full-grown in about 2 weeks; spun white cocoons from which the adults issued in 12 days.

Ootetrastichus formosanus Timberlake.

A specimen of this imported sugar cane leafhopper egg-parasite was reared from eggs of the leafhopper at Kawela, Molokai, March 19, 1930. It is the first record of its occurrence on Molokai. It is a mystery how it got there, as it was not purposely distributed to that Island.

Maruca testulalis Geyer.

A specimen of this moth was reared from blossoms of pigeon peas, Kawela, Molokai, March 19, 1930. A larva was also found in a blossom of *Sesbania grandiflora* at Mapulehu, Molokai, March 20, 1930. This moth had not been reported from Molokai previously. In Honolulu, it is chiefly found in the pods of green lima beans.

Telenomus nawai Ashmead.

The first evidence of the establishment of this parasite on Molokai was found March 19, 1930 at Kaunakakai. Egg clusters of *Spodoptera mauritia* Boisd. were found on palm leaves in the Dispensary yard, in which most of the eggs were parasitized. Similar egg clusters from which the parasites had issued were also found on palm leaves at the library in Wailuku, Maui, May 25, 1930.

Protaenasius sp. (?).

A single specimen of a chalcidoid insect issued from *Trionymus insularis* Ehrhorn collected on a grass (*Chaetochloa verticillata*) at Kanoa, Molokai, March 19, 1930. Mr. Fullaway believes it is the male of a mealybug parasite sent from Mexico by E. W. Rust in 1929. This would be its first recovery.

Sybra alternans Wied.

A specimen of this beetle was found on a dead aerial root of Pandanus at Paia, Maui, May 27, 1930. The first record of its occurrence on that Island.

Mestolobes minuscula (Butl.).

This moth was reared from a whitish larva found among the roots of a stool of sugar cane in field 48 of Oahu Sugar Co., April 19, 1930. The larva did no more eating, but spun a frail cocoon in the soil for pupation, and the moth issued May 8th. This is a very common moth, yet this is the first time that its larva has been found and reared. The habits of most species of the genus Mestolobes are unknown, and this may be a clue to where to look for their larvae. Moths were observed in the cane field, also in the brush and weeds of the gulch adjoining the cane field.

Some New Records of Insects on Molokai

BY O. H. SWEZEY

During the years of 1929 and 1930, at various meetings of the Society there was mention of the collecting of insects on Molokai, many of which were new records of their capture on that Island. For convenience of reference, these records are here segregated in systematic order. Unless otherwise stated the captures and records were by Mr. Swezey.

HYMENOPTERA

Silaon rohweri Bridwell.

Observed in the kiawe forest at Kanoa by F. X. Williams, May 31, 1929.

Notogonidea subtessellata (Smith).

This introduced wasp, parasitic on the field cricket, was observed not uncommon at Kanoa, May 31, 1929, by F. X. Williams.

Pseudogonatopus hospes Perkins.

One adult sugar cane leafhopper parasitized by this Chinese dryinid was observed at Kawela, Jan. 25, 1929.

Urosigalphus bruchi Crawford.

One specimen of this bruchid parasite collected at Kanoa, Jan. 25, 1929.

Glyptocolastes bruchivorus Crawford.

One specimen of this bruchid parasite collected at Kanoa, Jan. 25, 1929.

Telenomus nawai Ashmead.

Parasitized eggs of *Spodoptera mauritia* Boisd. found at Kaunakakai, March 19, 1930.

Bruchophagus funebris (How.).

One specimen swept from alfalfa, Kaunakakai, Jan. 25, 1929.

Scutellista cyanea Motsch.

Swept from pigeon peas at Kawela, Nov. 2, 1928.

Aneristus ceroplastae Howard.

Swept from alfalfa at Kaunakakai, Jan. 25, 1929.

Encyrtus infelix (Embleton).

Kaunakakai, March 23, 1929.

Anagyrus swezeyi Timb.

Reared from *Trionymus insularis* Ehr. on grass, Kanoa, Sept. 24, 1930.

Thysanus dactylopii (Ashmead).

Swept from Bermuda grass at Kawela, April 26, 1929.

Entedonine, species No. 104 of Timberlake's list in Proc. Haw. Ent. Soc., V, p. 441, 1924.

Reared from a cocoon of *Arachonoleter swezeyi* Cushman, collected at Kawela, April 26, 1929.

Ootetrastichus formosanus Timberlake.

Reared from eggs of the sugar cane leafhopper at Kawela, March 19, 1930.

Trichogramma minutum Riley.

Reared from eggs of *Spodoptera exigua* (Hüb.) at Kanoa, March 22, 1929.

COLEOPTERA

Bruchus sallaei Sharp.

Taken at light at Kaunakakai, Sept. 6, 1928, by Mr. Kutsunai.

Bruchus amicus Horn.

Swept from pigeon peas, Kawela, Nov. 2, 1928.

Bruchus limbatus (Horn).

Kawela, Jan. 25, 1929.

Caryoborus gonagra (Fab.).

On kiawe at Kaunakakai, Nov. 2, 1928.

Xylopsocus castanoptera (Fairm.).

Boring in stems of pigeon peas at Kawela, Nov. 2, 1928.

Lyctus brunneus (Steph.).

At light at Kaunakakai, Sept. 6, 1928, by Mr. Kutsunai.

Lyctoxylon japonum Reitter.

In dead kiawe at Kanoa, Nov. 2, 1928.

Colobicus parilis Pascoe.

Stuck in paint on building, Kanoa, Nov. 2, 1928.

Azya luteipes Muls.

Swept from pigeon peas, Kawela, Nov. 2, 1928.

Eucnocerus anthrenoides Sharp.

Kaunakakai, March 22, 1929.

Copris incertus var. **prociduus** (Say).

Abundant in and under cow dung at Mapulehu dairy, March 22, 1929.

Hister bimaculatus Linn.

In cow dung at Kaunakakai, August 6, 1929.

Dryophthorus homoeorhynchus Perkins.

In dead *Dracaena aurea,* Puu Kolekole, March 23, 1929.

Lagocheirus obsoletus Thoms.

At light, Mapulehu, Sept. 24, 1930.

LEPIDOPTERA

Erebus odora (Linn.).

Reported at Kaunakakai, by Mrs. Wight.

Maruca testulalis Geyer.

Reared from pigeon peas at Kawela, March 19, 1930; and a larva found in flower of *Sesbania grandiflora* at Mapulehu, March 20, 1930.

NEUROPTERA

Chrysopa lanata Banks.

At light, Kaunakakai, Sept. 6, 1928, by Mr. Kutsunai.

Hemiptera

Cyrtorhinus mundulus (Breddin).

On cane at Kaunakakai, Dec. 14, 1928, by Dr. Williams.

Draeculacephala mollipes (Say).

On sugar cane at Kawela, Jan. 25, 1929.

Aloha myoporicola Kirkaldy.

On *Myoporum sandwicense,* Kawela, 1500 feet, March 23, 1929.

Ilburnia leahi (Kirkaldy).

On *Lipochaeta lobata,* Kawela, 1000 feet, March 23, 1929.

Asterolecanium pustulans (Ckll.).

On kiawe, Kaunakakai, Nov. 2, 1928.

Orthoptera

Cycloptiloides americanus (Sauss.).

Under stone, Kanoa, Oct. 27, 1930.

Thysanoptera

Haplothrips usitatus (Bagnall).

On several species of grass, and a few other plants, Kaunakakai, Kanoa and Kawela, Jan. 25, 1929.

Strepsiptera

Xenos auriferi Pierce.

Two *Polistes aurifer* Sauss. collected at Kanoa, Jan. 25, 1929, were parasitized by this insect. One of the wasps had an empty puparium of the male; the other contained a female parasite from which the young parasites were issuing and crawling about on the abdomen of the wasp.

Arachnida

Latrodectes mactans (Fab.).

Under rocks, Kanoa, May 31, 1929, Dr. Williams.

Two New Species of Anchastus (Elateridae) from Fiji and Hawaii

BY R. H. VAN ZWALUWENBURG

(Presented at the meeting of January 2, 1930)

Indigenous species of the Elaterid genus Anchastus LeConte occur in such remote and isolated bodies of land as the Galapagos Islands and St. Helena, as well as on continental areas, which suggests the probable great antiquity of the genus. To its geographical range can now be added a species from the Fiji Islands, and another from the extremely isolated Hawaiian group.

Anchastus vitiensis n. sp.

Chestnut brown, moderately shiny, covered with a rather coarse, golden-brown pubescence which is semi-erect on head and thorax. Front gently convex; closely, finely and evently punctate. Antennae light chestnut brown, unicolorous; elongate, those of the male exceeding the posterior angles of the prothorax by four joints, those of the female, by about two joints. Second antennal joint very small; third joint the same shape, and nearly as long as the fourth.

Pronotum finely punctate, but less densely on disc than on front; more or less fuscous on disc; a little broader than long (median measurements); narrowed from just behind the middle to the anterior angles, the narrowing nearly straight, not arcuate. Posterior angles produced straight back and therefore parallel; unicarinate. Very small, but well-marked, notches on the posterior margin of the pronotum suggest the position of the sulci. Propectus rather abruptly up-curved behind the anterior coxae.

Elytra slightly wider than prothorax; parallel to about middle, thence conjointly narrowed to apex. Finely striato-punctate; intervals flat, finely punctate, slightly rugose, especially on basal half.

Beneath, dark reddish-brown, except for lateral margin of propleura and legs, which are testaceous.

Male, 7.0 mm.; female 7.75 mm.

Type male, Lami, Fiji, C. E. Pemberton, 1920; allotype female, Fiji Islands, 1905. Both are in the type collection of the Hawaiian Entomological Society, Honolulu, T. H.

Anchastus swezeyi n. sp.

Black, shiny. Pubescence fine; black except for whitish hairs disposed so as to form (1) roughly, a one-third segment of a circle on the basal half of each elytron, (2) an outline along the sutural margin, and (3) rather indefinite ashy areas on head and pronotum. These whitish hairs are sometimes thinly interspersed with black ones, and the color of the ashy

areas is partially physical, requiring turning of the specimen to be seen in its entirety. (Fig. 2). Front gently convex with suggestion of a median prominence; punctation fine, close and even. Antennae black, except for the first and second joints, and sometimes the tip of the eleventh, which are more or less rufous. Antennae of male exceeding posterior angles of pronotum by about two joints. Third joint nearly twice length of second, the two together about as long as fourth.

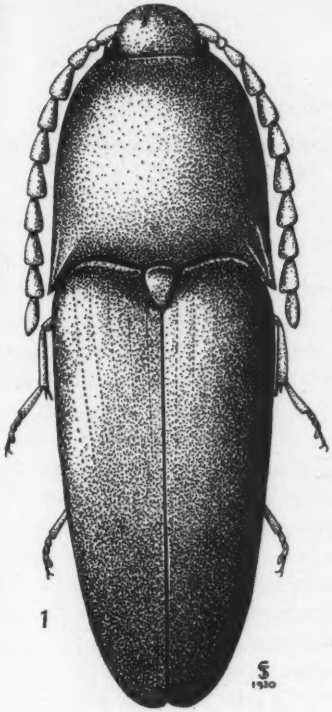
Prothorax a little broader than long (median measurements); punctation close and even, fine on disc, ocellate on sides. Fine, median canaliculation at base. Sides straight and nearly parallel to about middle, thence evenly rounded to anterior angles; posterior angles subparallel; only very slightly divergent; sharply bicarinate. No sulcal notches.

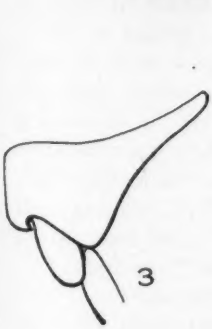
Elytra as wide as prothorax; about 1⅔ as long as head and thorax. Sides gently narrowed to beyond middle, thence more strongly to apex. Striae very finely punctate, evanescent beyond middle. Intervals flat, with extremely fine punctations.

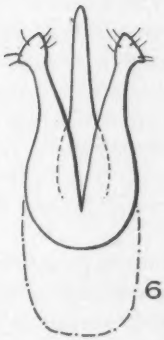
Beneath, black, except for legs and labial palpi, which are flavo-rufous. Males 4.75-5.33 mm.; females 5.25-5.66 mm.

Type male, 5 paratype males and 6 allotype females, all from the vicinity of Nahiku, Maui, T. H., elevation 1500 feet, O. H. Swezey and R. R. Whitten, August 20, 1929. The 12 specimens are in the type collection of the Hawaiian Entomological Society, Honolulu, T. H. See Plate XI, figs. 1-6.

This new, and probably endemic, beetle was numerous in the forest reserve above the government road, near Nahiku, on lehua (*Metrosideros*), ti (*Cordyline terminalis* Kunth), banana, etc. Larvae were taken in dead *Clermontia macrocarpa* Gaud. A pupal chamber containing a young adult contained also the last larval moult-skin; the larva is of the type of the tribe Steatoderini, as characterized by Hyslop (Ann. Ent. Soc. of America, Vol. 10, pp. 253-254, 1917), having the ninth abdominal segment smoothly ellipsoidal and the tenth extremely small. The region in which this species was taken is on the windward side of Haleakala, and is one in which no entomological collecting had ever been done previous to the visit of Messrs. Swezey and Whitten.







ANCHASTUS SWEZEYI.

Fig. 1. Dorsal aspect of adult female (X 18).
Fig. 2. Negative showing pattern of whitish pubescence.
Fig. 3. Left hind coxal plate.
Fig. 4. Hind tarsus in dorsal aspect.
Fig. 5. Hind tarsus in lateral aspect.
Fig. 6. Aedeagus of male.

ANNUAL ADDRESS

Some Observations on the Insect Faunas of Native Forest Trees in the Olinda Forest on Maui

BY O. H. SWEZEY

(Presented at the meeting of Dec. 12, 1929)

The particular region involved in these observations lies at an elevation of 3500-4500 feet on the slope of Haleakala, Maui, eastward from Olinda. It is about one mile across pasture land from the "Olinda" bungalow of Mr. H. A. Baldwin to the western edge of this forest. The forest is penetrated by a trail following the Kula pipe line—a wooden stave pipe which conducts water from the streams in the rain forest for domestic purposes of residents of the Kula district. It is about five or six miles to the extreme intake of this pipe at Honamanu stream. It is mostly a very rainy region.

There is a considerable area composed chiefly of *Acacia koa* extending for three or four miles along the trail and for about a mile below and another mile above. The other most important tree is the lehua, *Metrosideros collina polymorpha*, which is scattered among the koa trees, and makes up the most of the forest beyond the limits of the distinctly koa forest. Other trees scattered more or less but making up a conspicuous part of the forest are: *Cheirodendron gaudichaudii, Coprosma vontempskyi, Pipturus albidus, Straussia, Suttonia lessertiana, Sophora chrysophyllum, Clermontia arborescens.* Trees of smaller size and shrubs are: *Pelea* spp., *Broussaisia arguta, Cyrtandra cordifolia, Vaccinium penduliflorum, Rubus hawaiiensis* and tree ferns: *Cibotium chamissoi* and *Cibotium menziesii.* Climbing shrubs are *Freycinetia arnotti, Smilax sandwicensis* and *Alyxia olivaeformis.*

In January, 1926, attention was called to this region on account of a nearly complete defoliation of the koa trees, so that viewed from the lower regions the forest appeared to be mostly dead trees. It was first visited by Dr. H. L. Lyon and myself on January 13, 1926, at the instance of Mr. H. A. Baldwin, who accompanied us to the region on that day. The following day we were

accompanied by Messrs. F. Muir and R. H. Van Zwaluwenburg. Other visits were made to the region on February 26, 1926; October 10, 1926; February 10, 1927; June 11-18, 1927; February 13, 1928; August 16 and 25, 1929. These visits were primarily for the purpose of ascertaining the causes for the defoliation of the koa trees, and the after-effects upon the individual trees and the forest as a whole.

Right at the first it was demonstrated that the defoliation was caused by caterpillars of a native moth, *Scotorythra paludicola* (Butl.), which had increased in such enormous numbers as to practically entirely defoliate all the koa trees of the region. In the study of this situation observations were made on whatever other insects were attacking the koa trees, both in the living condition and after death. Similarly, the insect faunas of the other trees of the region were given attention. The results of these observations are herein arranged under the various respective host trees.

ACACIA KOA

Scotorythra paludicola (Butler)

When the region was first visited, the adult moths of this species were numerous along the trail, being scared up from the grass and banks by the side of the trail as one walked along. The koa trees at the time were so completely denuded that the cause of it was not always present, but on occasional small branches or sprouts and on some isolated trees in some of the gulches that were not so badly denuded, caterpillars were to be found feeding on the remaining vestiges of foliage. By digging in the ground and beneath trash and under moss on logs, pupae were also found. Some of the larvae and pupae were brought to the laboratory, and the moths that issued were the same as the adults which had been observed in flight along the trail.

In correspondence with Dr. Perkins, it was ascertained that there had been a similar defoliation of the koa trees in the Olinda region about 30 years previously, by caterpillars of the same moth.

There has been no recurrence of the 1926 outbreak since that time. The trees were slow in making a new growth, but during the summer they gradually became covered with new foliage. How-

ever, in many of the trees the branches died back at the tips from one to three feet, and many whole branches died. Thus some trees looked half dead, and there were others that died entirely. These latter may have been partially dead already at the time of the caterpillar attack, for there were standing dead trees at the time, both koas and other trees, as conditions have not been entirely favorable in the region and the whole forest has been on the decline.

At the time of the last visit to the place (August, 1929), the foliage was not suffering from attack of caterpillars. A few were present, and the adult moths were quite numerous, continually flying up along the trail. Whether the moths were numerous enough to bring about another epidemic of caterpillars with resultant defoliation of the koas has not been ascertained.

Other Insects on the Foliage

Lepidoptera

Lycaena blackburni (Tuely). A native butterfly whose larvae feed on the new foliage.
Archips postvittanus (Walker). A leafroller. Not common.

Homoptera

Ilburnia koae (Kirk.) A native leafhopper.
Ilburnia rubescens (Kirk.) A native leafhopper.
Nesophrosyne sp. A native leafhopper.
Siphanta acuta (Walker). The torpedo bug. Quite common.
Oliarus kahavalu Kirk.

Heteroptera

Oechalia grisea (Burm.). A predator on caterpillars. Quite common.
Nysius sp. A plant bug. Common.
Mirid bug. An occasional specimen.

Hymenoptera

Enicospilus mauicola Ashm. Parasite on caterpillars.

Diptera

Chaetogaedia monticola (Bigot). Parasite on caterpillars.
Frontina archippivora (Will.) Parasite on caterpillars.

Coleoptera

Pantomorus godmani (Crotch). The Olinda bettle. Abundant.

Acari

Leaf mites or red spiders. Sometimes abundant.

In Dead Twigs and Branches

Coleoptera

Proterhinus punctipennis Sharp. Rare in small twigs.
Plagithmysus finschi (Harold). Rare in trunks and branches.
Neoclytarlus pennatus (Sharp). Numerous in trunks and branches.
Parandrita aenea (Sharp). Rare.
Cis bimaculatus Sharp. Abundant.
Anobiid. Rare.

Hymenoptera

Ischiogonus palliatus (Cam.). Parasite of *Neoclytarlus pennatus.*

In Dead Wood and Logs

Coleoptera

Dryophthorus squalidus Sharp. In rotten wood.
Dryophthorus crassus Sharp. In rotten wood.
Oodemas corticis Sharp. In rotten wood.
Parandra puncticeps Sharp. In rotten wood.
Carabids. Several species. Predators, under bark and in rotten wood.
Eopenthes sp. Occasional larva in rotten wood.

Lepidoptera

Enarmonia walsinghami (Butl.) Common.
Aphthonetus bitincta Walsm. Rare.
Hyposmocoma lupella candidella Walsm. Larva in case.
Hyposmocoma chilonella Walsm. Larva without case.
Thyrocopa indecora (Butl.) Larva in rotten bark.
Opogona omoscopa (Meyrick). Larvae numerous in rotten wood.

Thysanoptera

Hoplothrips mauiensis Moulton. Under bark of dead tree.
Macrophthalmothrips hawaiiensis Moult. Under bark of dead tree.
Phloeothrips mauiensis Moult. Under bark of dead tree.

Miscellaneous

Hymenoptera

Alaptus sp. A parasite of psocid eggs. Rare.
Polynema sp. A parasite of psocid eggs. Rare.
Anagyrus sp. A parasite of mealybugs.
Sierola sp. A parasite of Microlepidoptera. Common.
Ecphylopsis nigra Ashm. Wingless parasite. Rare, on dead twigs.
Chalcids. Several species of these parasites.
Odynerus laevisulcatus Perkins. Nesting in borer holes in standing dead trees.

Heteroptera

Emesid bug. A predator. Rare.

Corrodentia

Psocids. Several species on bark of dead twigs.

METROSIDEROS COLLINA POLYMORPHA

Lepidoptera

Agrotis cinctipennis (Butl.). Cluster of eggs on leaf.
Scotorythra rara (Butl.). Looping caterpillar on leaves.
Eucymatoge monticolans (Butl.). Larvae on leaves.
Eccoptocera foetorivorans (Butl.) Tortricid larva on leaves.
Hyposmocoma chilonella Walsm. Larva in rotten wood.
Philodoria basalis Walsm. Leafminer.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. 2 species. Plant bugs on foliage.

Homoptera

Oliarus pele Kirk. 2 reared from nymphs in rotten log.
Siphanta acuta (Walk.). Torpedo bug. Common on new growth.
Leialoha lehuae (Kirk.). Leafhopper. Not common.
Trioza spp. 2 or 3 species. Jumping plant-lice. Very abundant. Producing galls on leaves.
Nesophrosyne sp. Leafhopper. Not common.
Saissetia nigra (Nietn.). Scale insect on leaves.

Hymenoptera

Pristomerus hawaiiensis Perkins. Parasite, reared from *E. foetorivorans.*
Sierola sp. Parasite of Microlepidoptera.
Aphanomerus pusillus Perkins. Egg-parasite of *Siphanta acuta.* Common.
Toxeuma ferrugineipes Ashm. Parasite on *Dryophthorus modestus.*
Sympiesis sp. Parasite of Trioza.
Polynema sp. Parasite of leafhopper eggs.
Chalcids. Several species. Parasites, their hosts not known.

Coleoptera

Thriscothorax subconstrictus Sharp. In rotten log, predacious.
Proterhinus sp. From dead twigs.
Cis sp. From dead twigs.
Dryophthorus modestus Sharp. In rotten log.
Dryophthorus declivis Shp. In rotten log.

Corrodentia

Psocids. 2 or 3 species. On bark and twigs.

CHEIRODENDRON GAUDICHAUDII

Lepidoptera

Scotorythra sp. Caterpillar on leaves.
Spheterista sp. Leafroller caterpillar, sometimes abundant.
Hyposmocoma chilonella Walsm. Larva in rotten wood.

Coleoptera

Carabid. In rotten wood, a predator.
Parandra puncticeps Sharp. Larva in rotten wood.
Proterhinus epichrysus Perkins. In dead twigs.
Anobiid. Larva in dead wood.
Scolytid. In dead trunk.
Araeocerus fasciculatus (De G.)
Nitidulid. On bark.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Abundant.
Oliarus similis var. c Giffard.
Nesophryne sp.
Nesophrosyne spp. 2 species. Leafhoppers.
Aphid. Plant louse on new foliage.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. Plant bug.
Nesiomiris hawaiiensis Kirk. Large green mirid bug.
Mirid bug. Small mirid bug.

Neuroptera

Hemerobiid. Predacious on aphids.
Anomalochrysa sp. Predacious on aphids. Eggs parasitized.

Hymenoptera

Angitia blackburni (Cam.). Parasite of *Spheterista* sp.

Corrodentia

Psocids. 2 or 3 species. On bark.

COPROSMA VONTEMPSKYI

Lepidoptera

Semnoprepia sp. Larva in rotten wood.

Coleoptera

Thriscothorax subconstrictus Sharp. In rotten wood, predator.
Thriscothorax unctus (Blkb.). In rotten wood.
Cerambycid. In rotten wood.
Anobiid. In rotten wood.
Dryophthorus sp. In rotten wood.
Proterhinus sp. From dead twigs.
Cis sp. From dead twigs.
Nitidulid. Beaten from foliage.

Hymenoptera

Odynerus sp. Pupa found in cell in borer hole in rotten wood.
Sclerodermus sp. Probably parasitic on anobiid larvae.
Toxeuma hawaiiensis Ashm.
Eupelmus sp.
Sierola sp.

Neuroptera

Anomalochrysa sp.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Abundant.
Oliarus similis var. c Giffard.
Ilburnia coprosmae Muir. Leafhopper.
Nesophrosyne sp. 2 or 3 species. Leafhopper. Common.
Aphid.

Heteroptera

Mirid bugs. 2 or 3 species. Leaf bugs.

Corrodentia

Psocids. 2 or 3 species. On bark and twigs.

PIPTURUS ALBIDUS

Lepidoptera

Vanessa tammeamea Esch. Kamehameha butterfly. Larvae on leaves.
Eucymatoge sp. (?) Larvae numerous on leaves, none reared.
Phlyctaenia sp. Larvae on leaves.
Philodoria sp. Leafminer.

Coleoptera

Plagithmysus simillimus Perkins. All stages in wood of dead tree.
Proterhinus sp. On dead twigs.

Homoptera

Nesophrosyne sp. Leafhopper.

Heteroptera

Tichorhinus sp. Leaf bug.

Corrodentia

Psocids. 2 or 3 species. On bark and dead twigs.

SOPHORA CHRYSOPHYLLUM

Lepidoptera

Scotorythra sp. Green looping caterpillar on leaves.
Mecyna virescens Butl. Larvae in webbed leaves.

Coleoptera

Plagithmysus funebris Sharp. Larvae in dead trees.

Heteroptera

Nysius sp. Leaf bug.

Tichorhinus sp. Leaf bug.

PELEA

Lepidoptera

Semnoprepia sp. Larvae in rotten wood.
Opostega spp. 2 or 3 species. Leafminers.

Coleoptera

Nesithmysus forbesii Perkins. Larvae boring in living wood.
Nesithmysus sp. Larvae boring in living wood
Nitidulid.
Proterhinus sp. From dead twigs.

Hymenoptera

Polynema sp. Egg-parasite of leafhopper.

Homoptera

Nesophryne sp. Leafhopper.
Nesophrosyne sp. Leafhopper.
Hevaheva sp. Psyllid on leaves, without galls.

SUTTONIA LESSERTIANA

Lepidoptera

Scotorythra sp. Larva on leaves.
Eulia sp. Larvae on leaves and boring in tips of stems.
Philodoria sp. Leafminer.

Coleoptera

Plagithmysus sp. (?) Larva in dead wood.
Dryophthorus modestus Shp. In dead wood.
Proterhinus sp. From dead twigs.
Holcobius haleakalae Perkins. Larvae in dead wood.

Homoptera

Siphanta acuta (Walk.). Torpedo bug.
Nesophrosyne sp. Leafhopper.
Delphacid. Leafhopper. Nymphs on leaves.

Corrodentia

Psocids. On bark and dead twigs.

Thysanoptera

Hoplothrips swezeyi Moulton. In dead tree.
Dermothrips hawaiiensis Bagn. Under bark of dead tree.

BROUSSAISIA ARGUTA

Coleoptera

Nitidulid.

Homoptera

Nesophrosyne sp. Leafhopper.
Delphacid. Leafhopper. Nymphs on leaves.

Heteroptera

Mirid bug. Leaf bug.

CYRTANDRA CORDIFOLIA

Lepidoptera

Phlyctaenia iocrossa Meyr. Larva under web on leaves.

Diptera

Cecidomyid. Adults, larvae and pupae on underside of leaves, among the numerous hairs.

Homoptera

Delphacid. Leafhopper.
Nesophrosyne sp. Leafhopper.

Heteroptera

Mirid bug. Leaf bug.

CLERMONTIA ARBORESCENS

Diptera

Agromyza sp. Leafminer.

Homoptera

Ilburnia sp. Leafhopper.
Nesophroysne sp. Leafhopper.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. Plant bug.
Mirid. Green plant bug.

RUBUS HAWAIIENSIS

Lepidoptera

Scotorythra rara (Butl.). Larvae on leaves, common.
Phlyctaenia endopyra Meyr. Leafroller.
Amorbia emigratella Busck. Leafroller.
Hyposmocoma chilonella Walsm. Larvae in pith.
Thyrocopa albonubila Walsm. Larvae in dead stem.
Opogona omoscopa (Meyr.). Larvae numerous in dead stems.

Coleoptera

Carabid. In dead stem. Predator.
Plagithmysus rubi Perkins. Larvae in dead stems.
Neoclytarlus modestus (Sharp). One adult captured on foliage (accidental).
Nitidulid. In dead stem.
Dromaeolus agritoides Sharp. Larvae numerous in pith.
Proterhinus epichrysus Perkins. Larvae in pith.
Apterocis sp. Larvae in pith.
Oodemas sp. Larvae in pith.

Hymenoptera

Nesoprosopis haleakalae Perkins. Nest in dead stem.
Hyposoter exiguae (Vier.). Parasite of *Scotorythra rara.*
Pycnophion fuscipennis Perkins. Parasite of *Hyposmocoma chilonella.*
Sierola sp. Parasite of Microlepidoptera.
Ophelinus mauiensis Ashm. Parasite of *H. chilonella* larva.
Eupelmus sp. (?) Parasite of *H. chilonella* pupa.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Common.
Saissetia nigra (Nietn.). Black scale.

Heteroptera

Nysius sp. Plant bug.

Thysanoptera

Hoplothrips swezeyi Moulton. In dead stem.

VACCINIUM PENDULIFLORUM

Lepidoptera

Scotorythra rara (Butl.). (?) Larvae on leaves.
Phlyctaenia pyranthes Meyr. Larvae on leaves.
Platyptilia rhynchophora Meyr. Larvae on leaves.

Coleoptera

Proterhinus sp. In dead twigs.
Oodemas sp. In dead twigs.
Cis sp. In dead twigs.
Anobiid.

Thysanoptera

Thrips. Abundant on leaves.

SMILAX SANDWICENSIS

Lepidoptera

Semnoprepia sp. Larvae in dead stems.

Coleoptera

Neoclytarlus smilacis Perkins. Abundant in stems, both living and dead.
Oodemas obscurum Blkb. In dead stems.
Proterhinus sp. In dead stems.
Cis sp. In dead stems.
Nitidulid. In dead stems.

Hymenoptera

Eupelmus sp. Parasite of *Neoclytarlus smilacis.*

ALYXIA OLIVAEFORMIS

Coleoptera

Mecyclothorax ovipennis Sharp. Beaten from dead stems. Predator.
Proterhinus sp. Beaten from dead stems.
Cis sp. Beaten from dead stems.
Anobiid. Beaten from dead stems.
Nitidulid. Beaten from dead stems.

Homoptera

Nesophrosyne sp. Leafhopper.

Hymenoptera

Hemiteles tenellus (Say). Parasite of lacewing fly.
Polynema sp. Egg-parasite of leafhopper.

Corrodentia

Psocids. Beaten from dead stems.

CIBOTIUM CHAMISSOI

Coleoptera

Mecyclothorax ovipennis Sharp. In dead frond stems, predator.
Atelothrus erro (Blkb.). In dead frond stems, predator.
Staphylinid. In dead frond stems, predator.
Nitidulid. In dead frond stems.
Pentarthrum prolixum Sharp. In dead frond stems.
Dryophthorus sp. In dead frond stems.
Proterhinus epitretus Perkins. In dead frond stems.
Proterhinus sharpi Perkins. In dead frond stems.
Tricopterygid. (?).

Homoptera

Oliarus halehaku Giffard.

Hymenoptera

Toxeuma sp. Parasite of *Proterhinus epitretus.*

ANNUAL ADDRESS

Origin and Development of Plant Quarantines

BY L. A. WHITNEY

(Presented at the meeting of Dec. 4, 1930)

As the year 1930 draws to a close, completing the 26th year of the activities of the Hawaiian Entomological Society, I am mindful of the fact that the outgoing executive officer is, by all rule and precedent, obliged to submit an address, and claiming no exemption from the established order, it devolves upon me at this time to present such a paper. My predecessors or at least a majority of them, being primarily interested in and identified with projects of a systematic nature, have chosen topics relating to systematic work as the subject matter of their discourses. With me the situation is somewhat different. While I am intensely interested in systematics and research, administrative duties so fully occupy my time and attention, that I have been unable to do more than maintain a slight contact with such work. In casting about therefore, for a suitable subject for this occasion, it occurred to me that possibly a brief paper concerning plant quarantine would be acceptable, and as no previous consideration seems to have been given this subject by those having gone before me, it appeared that a Brief Resume of the Origin and Development of Plant Quarantines would be appropriate.

At some period during the beginning of the latter half of the last century there occurred an event or perhaps more properly, a series of events that were destined to be known to future generations as the basis upon which plant quarantine practice is founded. I refer specifically to the transportation to and establishment in widely separated districts of Europe, of the grape phylloxera, a native American insect. The wine-producing interests of Europe, in their search for new strains of grapes to rejuvenate their vineyards had reached out to America in their search for propagating material and all unconsciously carried with their importations an insect that proved to be a veritable scourge to the unresistant vines

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of the old world. The pest spread and the scientific bodies of the several countries, the foremost among whom appears to have been the French Academy of Sciences, interested themselves in the problem, in an advisory capacity, and many unofficial measures were devised and tried to no avail. During this time, approximately 1882, an enterprising vineyardist by the name of Darnell of Gelong, Victoria, Australia, paid a visit to France and on his return to his native heath took with him a small parcel of plants and cuttings of desirable varieties of grapes for trial in that country, and also unconsciously, the dreaded phylloxera, which from all written records appears to have firmly established itself in Australia through that small importation.

This problem continued to occupy the forefront in agricultural matters in both Europe and Australia in succeeding years, and the Legislature of the State of Victoria seems to have been the first body politic to recognize the situation as a public menace, and accordingly passed an act in 1877 relating to the phylloxera situation, in which the word quarantine seems to have been first used in an agricultural sense. It was not an act however, so far as I can learn, comparable to the quarantine or plant inspection laws of our day, but was largely a sanitary measure designed to eradicate and prevent the spread of the insect within the confines of their own state. The problem became so serious in Europe, however, in spite of the remedial measures invoked, as to result in what was called the International Phylloxera Convention at Berne, Switzerland, November 3, 1881. The representatives of the various countries assembled, pooled their experiences and recommended legislation to their several governments, which was soon passed and made effective, prohibiting entry from the United States of grape vines and cuttings. This legislation, so far as known, is the first on record in which the movement of planting material between countries was regulated.

The history of the world shows that all far-reaching movements do not have their genesis solely at one time or in one place and horticultural quarantine is no exception to the rule, for in the seventies the agriculturists of the new world, particularly California, were becoming pest-conscious due to the levy on agriculture in that state by the phylloxera, which as has been shown was responsible for legislation in Europe and Australia; the San Jose

scale introduced into the state from the orient and the red scale of the orange, probably brought in with citrus planting material from Australia. The records indicate that the procedure followed in this instance was the same as that of Victoria and Europe, that is, sanitary measures within the state, under supervision of the government, were first tried and no attention was given to the import phase. The ineffectiveness of this method was soon apparent, however, and a number of the leading fruit producers instituted an educational campaign which resulted in a bill being brought before and passed by the California Legislature in 1881, providing not only for the control of agricultural problems within the state, but a strict supervision of all agricultural imports.

At this point, the Kingdom of Hawaii enters the picture. The early settlers appreciating the agricultural possibilities of Hawaii, were casting about for suitable crops with which to develop the kingdom. A number of projects were under way, one of the most promising of which seems to have been coffee. Great interest in this crop was manifested, and at that time it appears to have been one having possibilities of major importance. At any rate, unofficial agricultural explorers returning from the coffee-producing areas of the orient reported a serious disease affecting coffee in several localities and it was considered so important that in 1888 the Monarchial Legislature passed a law which was later signed by King Kalakaua, prohibiting the importation of coffee trees and shrubs into the Kingdom. Incidentally, this order, modified in certain respects, is still in effect.

Following the lead of Europe, California and Hawaii, practically every important agricultural nation in the world, and in many instances, political subdivisions within nations, especially those with maritime contacts have promulgated and are enforcing laws and regulatory orders governing the movement of plant material. It is a practice born of necessity, and while no claims are made as to its complete efficacy, its almost universal adoption indicates that it has fully justified itself economically and is altogether entitled to rank with those other major phases of crop protection, —biological and artificial control.

Plant inspection and quarantine policies, in common with other biological activities have proceeded down through the years from a very crude beginning, when regulations were principally pro-

hibitory and enforced in a rather desultory manner, as a minor activity of an already existing department, to our own time when we find most countries maintaining highly specialized bureaus with personnel adequately trained to keep a constant surveillance on all incoming material. Regulations have also undergone a similar change. The state has recognized the inherent right of the individual in the matter of importations and as a result qualitative or conditional regulations are more often utilized than the strictly embargomatic orders of a few decades ago.

What the future holds for plant inspection and quarantine it is impossible to estimate. With the rapid expansion of the world's commercial horizons by the annihilation of distance through the unprecedented development of modern transport systems, which brings the farms and gardens of the world almost to our door, so to speak, the problems of the quarantine enforcement agencies are becoming constantly more complex. It appears reasonable to assume therefore, that regulatory work will become increasingly more important as time goes on and that there will be a greater change and improvement in policies and procedure during the next few decades than we have witnessed during the early organization of the work.

Descriptions of New Hawaiian Coleoptera

BY DR. R. C. L. PERKINS

(Presented by title by O. H. Swezey at the meeting of December 4, 1930)

I have here described three very interesting new species of Proterhinus collected recently by Mr. O. H. Swezey and also the remarkable form discovered in the Phoenix group by Mr. E. H. Bryan some years ago. To these I have added descriptions of a few species of other genera, three belonging to Cis and one to Oodemas, as well as another Hawaiian Proterhinus, all collected many years ago by myself.

In the descriptions of Proterhinus, the first paragraph gives such characters as would, I believe, be sufficient by themselves to separate each species from any already known and would facilitate identification. Unfortunately the very limited number of specimens leaves us in ignorance of the range of variability of the species described, though variation and aberration is of common occurrence in many of the Hawaiian forms of these difficult insects.

Proterhinus kahanae sp. nov.

A large red species with the head and antennae black, eyes large and extremely prominent, elytra with oblong dorsal flattened area from the base to the strongly declivous posterior portion, bounded laterally by the third interstices, the sides subvertical, the basal tubercles and humeral angles strongly produced, clothed with white decumbent pubescence and elongate spinose erect setae.

Female with shining rostrum, smooth down the middle and on either side of this with strong, distinct punctures, the face with pale pubescence, the eyes large and extremely prominent; antennae stout, black, the club-joints more or less piceous or reddish, especially the apical one; scape stout, elongate, subtriangular, second joint robust and ovate, the third elongate, but this and the following joints, which decrease gradually in length, are all less slender than in most species and their surface is roughly sculptured; the club is very definite, its first joint being only about as long as wide and very different from the preceding. Pronotum very strongly narrowed in front, where it is only about half as wide as at the middle, and also greatly narrowed behind; the surface is very uneven, having a large vague median impression in front and a shallow median one posteriorly, which in some aspects appears continuous with the other, while on either side of the middle there is a conspicuous round depression; the clothing is not dense enough to conceal the punctures and consists largely of minute scale-like setae (as seen under a strong lens) with some pubescence, and erect, conspicuous, spine-like hairs, with bent tips, these hairs being most numerous anteriorly

and at the sides, while at the hind angles there is a patch of white woolly pubescence. Elytra subparallel-sided for the greater part of their length, the basal tubercles strongly developed, in dorsal aspect angulately produced forwards, the humeral angles very strongly produced; the flattened, oblong, dorsal area is well clothed with white, almost woolly, appressed pubescence, but between this and the lateral margins much less so, where minute appressed scale-like clothing is apparent; on these sides and on the apical declivous part long, spiniform, erect setae are very numerous, but on the dorsal flattened area they are shorter and sparser; the punctures are excessively coarse and the first interstice (extending back from the basal tubercles) is irregularly elevated, the raised parts more or less sinuate owing to the encroachment of the gross punctures of the first and second series; the next interstice is not thus elevated, but the third (which is continuous with the humeral prominence) is again raised unevenly and forms the edge of the flattened dorsal area. The legs are stout, and both femora and tibiae in addition to the appressed hairs are well clothed with erect setae, similar to the shorter ones on the elytra; the tarsal lobes are large. Beneath, so far as can be seen, the basal abdominal segment is densely, minutely granulate rather than punctured, as are the intermediate segments, while the apical one has some distinct, scattered, fine punctures. Length about 5 mm. The specimen is perhaps not quite mature and in older ones parts of the pronotum might be black, as the type shows evidence of partial infuscation.

Hab.—Oahu, Kahana, 22.ii.28, in dead twig of Broussaisia (Swezey).

Proterhinus cristatus sp. nov.

Black or dark fuscous, irregularly clothed with golden squamosity and the elytra with long, erect, conspicuous, pale setae; antennae obscurely red, dark apically, legs for the most part blackish, but the tarsal lobes are conspicuously pale or red. Head so constricted that a very definite raised transverse ridge is formed behind the eyes, somewhat resembling that of *P. deinops*.

Female: rostrum shining, the spaces between the fine punctate grooves have an excessively minute sculpture, hardly visible under a very strong lens; antennae with the scape elongate and moderately robust, the second joint longer than wide, more robust but distinctly shorter than the third, all the following joints elongate, decreasing in length towards the apex, the eighth joint notably less wide than the basal club-joint; eyes moderately large and very prominent, in dorsal aspect of the insect subconical, with apparently no tendency to be produced into a point posteriorly in the manner of *P. deinops*. Pronotum with subelongate appearance, widest near the middle, the sides nearly straightly convergent thence to the front margin, behind the middle slightly sinuate inwardly as they converge towards the hind margin; there is no construction or abrupt narrowing anteriorly, the lateral impressions are round and not large, but quite distinct, the anterior one represented by hardly more than a flattening of the surface; the golden clothing is wanting or nearly so on the areas of the depressions and along the middle line to near the front and hind margin; curved, suberect setae along the sides anteriorly which are evident in so many species are almost absent or very few and inconspicuous. The elytra are extremely similar to

those of the form described as var. *moestus* of *P. squamicollis*, which I now consider a species distinct from the latter; the basal tubercles are conspicuous and the humeral angles acutely produced; the clothing consists of irregular maculations and the elongate erect setae, though not dense, are very conspicuous; the surface generally, apart from the basal tubercles and the usual impression on either side of these, is simply convex, without ridges or other inequalities. Beneath, the basal segment of the abdomen bears quite distinct but shallow punctures on the disc and in some aspects appears distinctly shining. Length about 3 mm.

Hab.—Oahu, Mt. Kaala, a single female in dead twig of Broussaisia, 9.ii.30 (Swezey).

Proterhinus xanthoxyli sp. nov.

Blackish fuscous, inclining to red in parts (especially the rostrum and along the basal margin of the elytra) the legs and antennae also more or less dull red; pronotum well clothed above with appressed golden scaly setae, but exteriorly to the well-defined, deep, round, impressions the surface is almost bare; elytra tuberculate on either side of the scutellum and with acute humeral angles, largely bare, having sparse golden maculations, the erect setae white, conspicuous but sparse, most numerous on the pale spots that are seen at about two-thirds of the length of the elytra from the base.

Rostrum very minutely punctured between the grooved punctate lines; the eyes by no means large for the size of the insect; antennae with distinct 3-jointed club, its first joint being notably longer and larger than the preceding one, all the funicle joints elongate, the second the longest, and appearing longer than the stouter first joint, at least in some aspects. Pronotum rather long, sulcate down the middle, the anterior end of the sulcation expanded to form the anterior depression, the lateral ones deep, round and distinct. Elytra as described above, and with at most faint evidence of longitudinal ridges due to the sides being a little compressed on the middle part, the outline only gently curved from the middle to the apex (as seen in profile) and not at all abrupt posteriorly. Basal abdominal segment beneath dull, with dense microscopic surface sculpture and on its middle portion with a very few uneven punctures. The tarsal lobes are large and a rounded ridge is formed at the meeting of the joint and vertex of the head, but the constriction is not comparable with that of *P. cristatus*. The specimen is probably not quite mature. Length about 3 mm. Swezey has suggested to me that this insect is allied to *P. dispar*, and I think this suggestion is correct, but the species are quite distinct. The golden clothing of the pronotum in *P. xanthoxyli* is very beautiful, and just those parts which are most densely clothed in *dispar* are almost bare in the other.

Hab.—Oahu, Waianae Mountains, Haleauau, bred from dead branch of Xanthoxylum, 9.ii. 1930 (Swezey), a single female.

Proterhinus phoenix sp. nov.

A narrow, elongate species, blackish fuscous, becoming reddish in parts, the legs sometimes wholly red and the antennae paler red or testaceous; the clothing of pale depressed setae is of general distribution, but not dense.

Male with the basal joint of all the tarsi produced into a strong elongated spine; female with well-defined parallel-sided rostrum, as long as wide, and dull from the dense microscopic sculpture.

The head of the male is of remarkable form, being very broad anteriorly in front of the eyes and with rounded sides, so that the part in front of the antennae is nearly semi-circular in outline, and the short, more or less straight-sided rostral portion of ordinary species is not defined. In the female the rostrum is of ordinary form and with the usual longitudinal grooves, the surface quite dull, but bearing only scanty setae. Eyes small but prominent and, as usual, bearing setae. Antennae very short, second joint elongate-ovate, longer and much stouter than the third, which is subelongate, the more apical joints of the funicle being moniliform, the club 3-jointed, though the first much longer and stouter than the last funicle joint, though it is much smaller than the following club joint. Pronotum clothed like the head with appressed, curved, pale setae of general distribution, bearing no definite impressions and not conspicuously or abruptly narrowed or constricted in front. Legs clothed with similar appressed setae, but the tibiae lack the stout erect ones, seen in nearly all Hawaiian species; the tarsal lobes are ordinary and the legs present no remarkable feature except the great spine, directed backwards, into which the small basal joint of all the tarsi is produced beneath. Elytra long and narrow, about twice as long as the pronotum, nearly evenly convex, the humeral angles not produced, clothed with stout, depressed, curved, pale, glassy setae, which form no distinct pattern, but are usually more dense in some parts than others, e.g., on an area on either side of the scutellum, on another near the middle of the elytra on either side of the suture and on some more lateral parts. The more densely clothed areas are usually red, or at least redder than the adjoining surface. In addition to the appressed setae there are very sparse, short, erect, white ones, more noticeable towards the apex and along the side-margins of the elytra; the punctures, more clearly seen on the basal part, are coarse and close-set in their lines. The metasternum is strongly punctured, but the abdomen basally in the middle less so, the punctures more or less sparse or becoming obsolete. Length 2-3 mm.

Hab.—Phoenix Islands, Enderbury Id., March 19, 1924, from bunch grass (E. H. Bryan, Jr.). Described from ten carded specimens, and one or two dissected.

Proterhinus debilior sp. nov.

A small, narrow, elongate species, varying from nearly black with only a small part of the elytra obscurely reddish, to a red color more or less darkened or infuscated in parts; the antennae with 2-jointed club, the ninth antennal joint being very little different from the eighth, and very different from the much wider tenth joint. Elytra with the humeral angles not acute and posteriorly bearing very short, stout, erect, white setae, which are very conspicuous.

Rostrum of female shining between the punctate lines, the head behind this well clothed with appressed flavescent setae, the antennae in the type red basally, but in one specimen entirely black; antennae rather slender, the scape stout subtriangular, second joint also robust as compared with the

following, the club 2-jointed; the eyes small. Pronotum subrotundate, clothed unevenly with curved appressed setae forming a denser band from the hind angles, while along the side margins some more outstanding strongly curved setae are apparent. Elytra irregularly or submaculately clothed with similar appressed, flavescent setae, which are denser basally on either side of the scutellum, on another area extending back from the humeral angles, and on the posterior declivous portion; the darkened parts of the elytra are very little clothed, though each puncture bears an extremely small pale seta; the erect pale setae of the hinder part of the wing-cases are short, but very stout and conspicuous. Length 2-2.5 mm.

There are few species in which the club can be called 2-jointed as in this one, which appears most like *P. debilis* Sh., but it is easily known by its longer, narrower elytra, blunter humeral angles, more slender antennae and differences in the clothing. Like *debilis* it is frequently covered with excretion which in my specimens was removed with difficulty.

Hab.—Maui, W. Maui Mountains; possibly in the stems of low-growing plants or ferns, on which *debilis* is found. Three specimens, all females, were taken in 1902.

Oodemas striatipenne sp. nov.

Aëneous-black, less metallic than most species, shining, elongate and not robust. The rostrum is slightly wider on its apical portion than behind the insertion of the antennae; the club and base of the scape being paler than the part between, the first funicle joint is very short, the second elongate and about as long as the next two together, these being globular. Pronotum very finely and remotely punctured. The elytra are conspicuously striate, the striae fine, but not shallow, their punctures fine and shallow, remote and nearly equidistant from one another, the interstices with fine and distinct punctures. The lobate joint of the front tarsi is large. Length 3-3.5 mm. This species is easily known by its very distinct and regular striation, the inner striae distinct and definite from (or very nearly from) the base of the elytra.

Hab.—Oahu, Mt. Kaala; two specimens of uncertain sex taken about thirty years ago.

Cis nudipennis sp. nov.

In form like *tabidus*; the elytra in typical specimens pale, yellowish or testaceous, black along the margins and with a band, broken or entire, near the middle, but there is often also black suffusion basally and along the suture behind the submedian band, while in extreme forms the pale color is confined to the apical declivous portion. Pronotum black, not distinctly metallic, pale along the front and hind margin, very finely but distinctly punctate, with fairly wide spaces between the punctures and without clothing. The elytra are also without clothing except for excessively minute setae, scarcely visible as minute pale specks under a very strong lens; the sculpture consists of extremely feeble or obsolete punctures, inclining to rugulosity, on the basal part, and becoming still less posteriorly, the apical declivous portion

being practically impunctate. As in other species the size is variable, some examples being twice as large as others.

This species lacks the conspicuous metallic color of the pronotum of *nesiotes* and *cognatissimus* and generally the elytra are much less strongly sculptured; from *tabidus* and others the total absence of outstanding hairs on either the pronotum or elytra sufficiently distinguish it. The puncturation of the pronotum seems much less variable than in several of the allied species. In my original collections specimens were probably mixed with *setarius* and *tabidus*.

Hab.—Hawaii, Maui, Lanai and probably some or all of the other islands. Most of those examined are from Kona and Kau, Hawaii.

Cis gravipennis sp. nov.

Black, with the antennae and legs red, shining and without any evident clothing; the elytra are long and almost parallel-sided from the base to about the apical third of their length; the pronotum is entirely black or at most with a piceous tint of an obscure nature on the front and on the middle of the hind margin.

Pronotum finely but distinctly margined at the sides and behind, very distinctly and evenly, copiously punctured, the hind angles obtuse. Elytra more or less roughly punctured on the basal portion, so as to be subrugose, the punctures uneven in size, some being much coarser than others, and posteriorly the sculpture is finer and sparser, but is continued on to the apical declivous portion, though in the smallest example it becomes very indistinct and obsolete there, the surface being less black, perhaps from slight immaturity. This species is evidently somewhat larger than *setarius* and is remarkable for its black color, and differs from this and *tabidus* in the absence of any erect hairs and also in sculpture. Length about 2 mm.

Hab.—Hawaii, Kona District, 4000 ft., three specimens taken many years ago.

Cis dracaenae sp. nov.

Black, or blackish fuscous, the front and the middle of the hind margin of the pronotum and also the suture of the elytra pale. Shape subfusiform, convex; oral region of face, antennae and legs, red or yellow, club of antennae dark. Pronotum densely and very evenly, distinctly, strongly punctured, shining, distinctly margined at the sides, but not posteriorly, clothed (like the elytra) with excessively minute hairs; elytra subacuminate from near the base, with gross, indefinite punctures on the basal portion, between which very minute ones are evident, the whole forming a more or less rugose sculpture; the apical portion is much more finely sculptured. In *haleakalae* apart from other differences the punctures of the pronotum are so dense that practically no space is left between them, while in the present species there is considerable smooth shining surface. Length 1.2 mm.

Hab.—Oahu, Nuuanu Pali. Two specimens, one pale and immature, were obtained from a trunk of Halapepe (*Dracaena aurea*) when I was digging out a species of Xyleborus, which was attacking these trees.

Cis haleakalae Perk.

A single specimen of this series was taken at Kilauea, Hawaii, in July, 1906. The unique type was from Haleakala, Maui, 5000 ft.

Records of Immigrant Insects for 1929 and 1930

BY THE EDITOR

In this issue of the Proceedings, the following immigrant insects are mentioned. Those marked with an asterisk were observed for the first time on the date mentioned. The others have been known before, but herein named for the first time. Pages refer to where mentioned in the text.

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